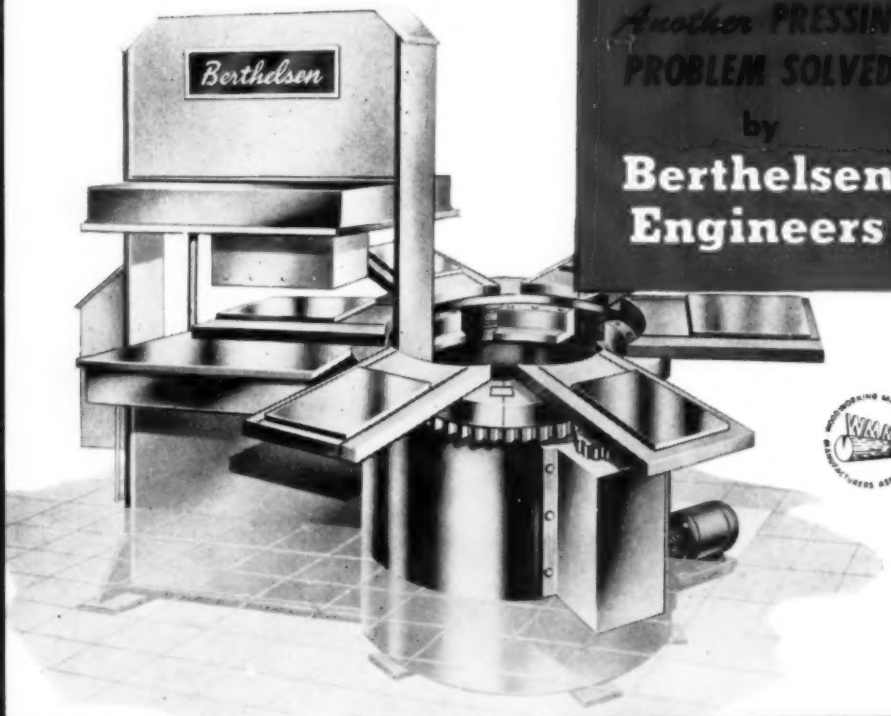
ONE COPY PER PATENT NOTICE
B 601429

JULY, 1956

WOOD WORKING Digest

A HITCHCOCK PUBLICATION

JUL 23 1956



Another PRESSING PROBLEM SOLVED by Berthelsen Engineers

PROBLEM:

Assemble, bond, emboss and applique metal trim to automobile trim panels in one operation.

SOLUTION:

Berthelsen Engineers designed a Berthelsen Hot Press that completely automates the operation. A single opening press equipped with a combination embossing and bonding die was combined with a specially designed indexing rotary feed table. The loading and feeding operation is synchronized to the curing cycle of the press.

RESULT:

The Berthelsen solution resulted in a 3-way advantage:

1. Lower labor costs by combining operations.
2. Increased production thru automation of manual operations.
3. Lower material costs by enabling use of a plastic trim with low cost filler previously unusable when applied by other methods.

The problem illustrated is just one example of how BERTHELSEN ENGINEERS are solving various production problems involving bonding, pressing, forming and laminating applications in the Aircraft, Automotive, Construction, Furniture, Plywood, Plastic and Woodworking Industries. Take time, now, and find out how Berthelsen "know-how" and engineering skill can be applied to the design of a Berthelsen Press to solve your particular pressing problem. We'll be pleased to discuss your problems with you. Write for further information today.

BERTHELSEN PRESSES

P. O. BOX 1423 • LOCKPORT ROAD • JOLIET, ILLINOIS

JUL -9 1956 B 601429

T5840 W83

OLIVER Band Saws speed work through machine room

Leading woodworkers use 36-in. Saw

This Oliver handles a wide range of work smoothly and rapidly. Takes 22" under the guide. Table tilts 45° to right, 7° to left. Motor-on-shaft or any other type drive available. Its ring-disk wheels run true without vibration at highest speeds.

Power-Feed unit handles 80′ a minute

New unit has micrometer fence and rubber feed-wheel with micrometer adjustment. Attach it to your present saw.

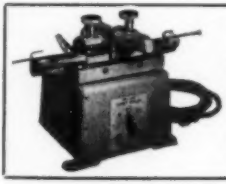
38" BAND SAW handles widest range of work. Takes 21" under guide. Table tilts 45°. Finest ring-disk wheels.

30" BAND SAW takes 15" under guide. Table tilts 45°. Demountable ring-disk wheels. Finest braking system.

Most complete 18-in. Band Saw built

It has many adjustments and refinements developed for larger Oliver Band Saws. Its work is smooth and accurate. Large machined table tilts to 45°. Takes 10" under guide. Rips to 11" wide. Miters and cross-cuts to 6½". Has ripping fence and miter cross-cut gauge. Built to give years of top service.

Write today for Bulletins containing complete information



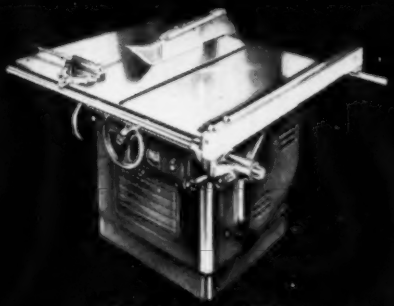
Brazes a band saw blade perfectly in a few seconds

New Oliver Brazer makes a braze as good as the saw itself. Blades up to 1½" wide are accurately aligned. Easy to operate. Tempering process fully controlled. Ask for Bulletin 562.

OLIVER MACHINERY CO.

Established 1890 **GRAND RAPIDS 2, MICHIGAN**

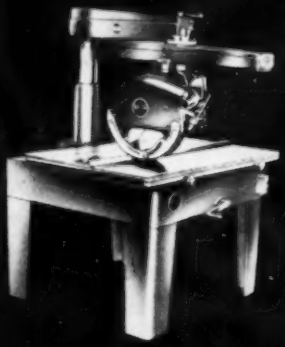
ROCKWELL-BUILT



CIRCULAR SAWS:
12", 10" Tilting Arbor; 10" T.A. Bench

JOINTERS:
8", 6" Long Bed

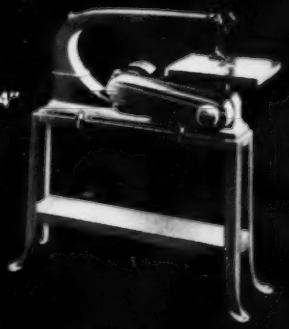
BAND SAWS:
20", 14"



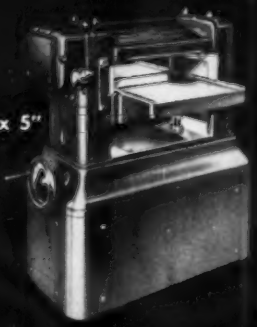
RADIAL SAWS:
20", 16", 14", 12", 10", 9"

SHAPER:
Industrial and Bench

SCROLL SAW: 24"



PLANER: 13" x 5"



DELTA
ROCKWELL

. . . world's most complete power tool line
53 machines . . . 246 models . . . over 1300 accessories

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DELTA woodworking tools

The right tool to fit your needs from the world's most complete woodworking line

SAVE MONEY

Thousands of shops across the country are cutting costs by using accurate, rugged, versatile Delta woodworking power tools to supplement—and often replace—heavy, expensive, single-purpose machines. You can, too, and here's why:

DO MORE WORK FASTER: Delta woodworking tools give you all the speed and power you need to handle many jobs normally done on larger machines. And they do the work quickly, accurately, *at far less cost!*

RUGGED—ACCURATE: Built-in Delta precision assures extremely close tolerance work with less waste. And Delta tools are ruggedly built to stay accurate through years of punishing everyday operation.

EASY TO MOVE: Portable Delta tools can be moved right to the work to reduce expensive materials handling, eliminate bottlenecks, put greater flexibility into your operations.

SEE THE ENTIRE DELTA WOODWORKING LINE: And get the facts on how Delta tools can save on initial investment, on maintenance, on replacement—*then make up your own mind!* Your Delta Dealer is listed under "TOOLS" in the yellow pages.

Get all the Facts-- Today!

Delta Power Tool Division,
Rockwell Manufacturing Co.
666G N. Lexington Ave., Pittsburgh 8, Pa.

☐ Please send Delta Industrial Catalog on entire Delta woodworking line.

☐ Please send name of my nearest Delta Dealer.

Name_____ Title_____

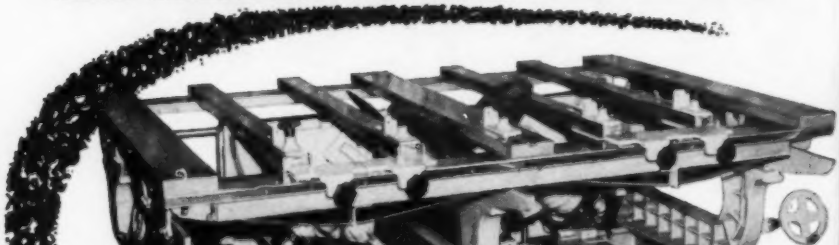
Company_____

Address_____

City_____ County_____ State_____

another product by ROCKWELL

SPECIFY BEACH DOUBLE CUT-OFF SAW



- two independent, tilting arbors with built-in motors
- table travel from 24"-100"

TILTING TABLE SAW

Where high precision woodworking operations are necessary, specify BEACH DOUBLE CUT-OFF SAWS. Tilting arbors make it possible to: 1) cut 2 mitres, 2) cut square at one end and mitre the other, 3) square both ends in one operation, 4) cut a compound mitre with 1 saw.

CARRIAGE mounted on **ANTI-FRICTION ROLLERS** for greatest accuracy of movement

END ROLLS and tracks have flat surfaces

SLIDING TABLES may be secured in any desired position with a single hand screw

ARBORS are independent units with ball-bearing, 5 H.P. motor mounted on mandrel. Each arbor tilts to 45° with 6" independent vertical adjustment

MANDREL SPEED 3600 R.P.M.

WRITE TODAY! for complete information and specifications on the Beach Double Cut-Off Saw.

BEACH
MANUFACTURING CO.
MONTROSE, PA.

EMBER
BPA
JULY, 1956
Vol. 58 No. 7
Published Monthly

WOOD WORKING Digest

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Dependable HYDRO-TRAVL KNIFE GRINDERS give you faster, more automatic knife grinding

Knife grinding accuracy — and speed — goes up, maintenance costs come down with Dependable's new and improved Hydro-Travl Knife Grinder.

Now equipped with the finest Solenoid valve available for controlling carriage travel, the Hydro-Travl gives you trouble free service for years to come. There's practically nothing to wear out. Solenoid valve is guaranteed up to 20 million reversals.

Completely automatic, the Hydro-Travl is designed to grind high speed, carbon steel or carbon knives . . . straight or hollow ground. It's so automatic that all you need do is set-up, it cuts off automatically when grinding is complete.

Double plunger hydraulic carriage drive assures more positive carriage travel. There's no back-lash and shock in carriage reversal. Hydraulic system is designed to last a lifetime. Leakproof, trouble-free, because there are no gears to wear out.

Other outstanding design features of the Dependable Hydro-Travl include hardened ground steel V-ways, wide range of variable table speeds, centrally located controls and heavy duty cast-iron carriage base. Available in 32″ and 48″ models.

Write today for Bulletin C-14 and name of nearest dealer.

Dependable Also Builds

- Gang Rip Saws
- Knife Jointers
- Knife Grinders
- Knife Balancers
- Head Grinders
- Saw Grinders
- Blower Fans
- Moulders
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Dependable

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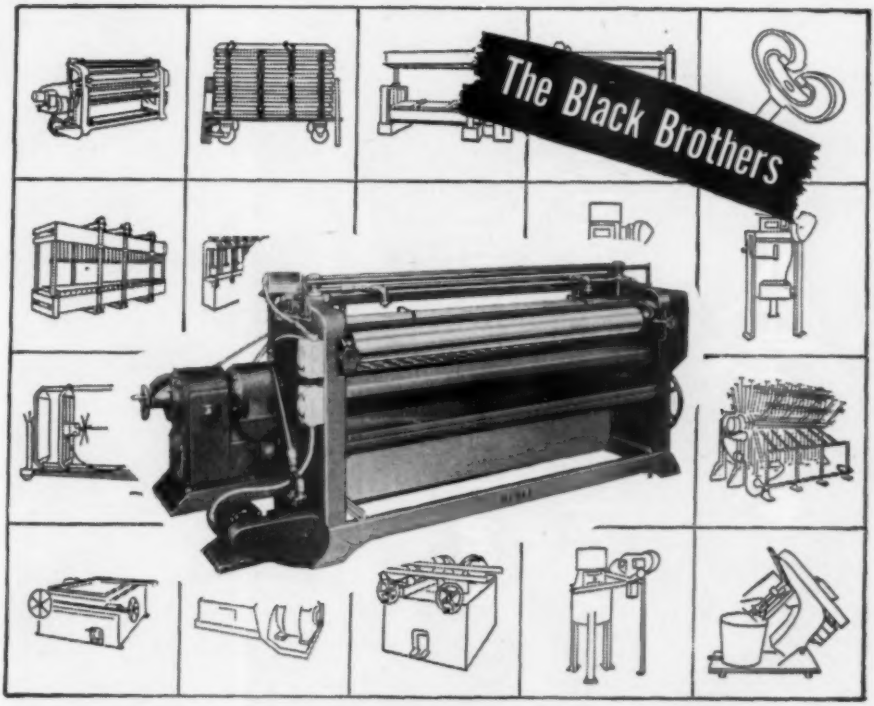
OPENINGS FOR RELIABLE DEALERS IN CERTAIN AREAS OF U.S.A. AND CANADA



Resilient Roll, Ball Bearing Glue Spreader

The No. 22-D Resilient Roll Ball Bearing Glue Spreader for resins, caseins, and other cold glues of similar characteristics is unmatched in speed, economy, accuracy, cleanliness and quality production. Gluing rolls are deeply covered with fine synthetic rubber and are especially grooved to control the amount of spread and to conform to irregularities in the stock. Doctor rolls are heavily chrome *coated* to accurately control the glue spread and eliminate corrosion. Water cooled doctor rolls are available for prolonging the working life of resinous adhesives. Write for Bulletin 11-A Supplement covering this extremely popular spreader . . . or let us send a catalog on the complete Black line.

"If It Is Gluing Equipment - We Have It"

THE BLACK BROTHERS CO., INC.

MENDOTA, ILLINOIS, U. S. A.

What's the dependable
glue for durability?

Bordon

Borden's adhesive specialists have to consider a variety of factors before they can recommend the right glue for each gluing job. Particularly when the *durability* of the glue is an important question.

For example: Will the end product be exposed to heat? Cold? High humidity? Extreme weather conditions? How durable is the product to be? What kind or kinds of woods are to be used? Fir? Gum? Poplar?

These questions and many more are asked by Borden because no one glue or type of glue is durable enough for every job. Therefore, to meet your specifications with the *right* glue, Borden specialists apply 35 years of experience and experimentation with adhesives to your needs. These experts analyze your requirements, and then—by utilizing Borden's wide range of catalysts and modifiers—come up with the best glue for your requirements.

If you would like to receive informative data on this subject of "durability," write for Service Bulletin No. 72a, "Durability of Woodworking Adhesives", which sets forth the results of long term durability tests on plywood aged 10-16 years bonded with synthetic resins. The Borden Company, Chemical Division, Dept. WD-76, 350 Madison Ave., New York 17, N. Y.

INDUSTRIAL ADHESIVES

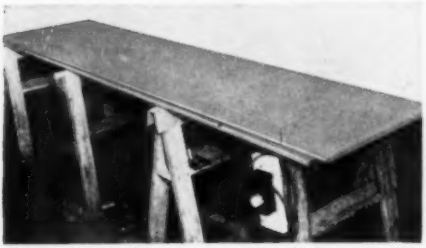
THE *Borden* COMPANY

CHEMICAL DIVISION

POLYVINYL • CASEIN • UREA RESIN • RESORCIN RESIN • PHENOL RESIN • EPOXY RESIN ADHESIVES

Us-Kon HEATING BLANKETS

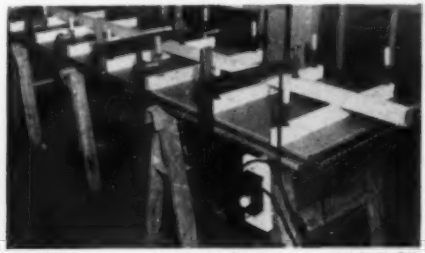
Curing a table top in less than 10 minutes with ordinary shop equipment



First, plastic laminate is placed face up on adhesive-coated foundation core. Inexpensive capillary tube-type thermostat is placed close to work.

Us-Kon Blanket is sandwiched between upper and lower platens. Thermostat capillary tube inserted in drilled and slotted hole (arrow) controls blanket temperature.

Assembly of table top is now ready for application of pressure clamps. Notice the thermostat control tube in the platen (arrow) atop the blanket.



Finally, pressure is applied with adjustable "C" clamps along edges and at center of assembly. An 8 to 10 minute cure time produces finished counter top.

Another demonstration of Us-Kon Heating Blanket speeding up production and melting costs

This laminator of plastic table tops steps up production, saves working space and money using Us-Kon® Blankets. Each blanket does the job of equipment that might cost 33 to 50 times as much. The heating element in Us-Kon Blankets is conductive rubber—there are no wires. Blankets are uniform in thickness—no bumps, no hot spots, always uniform heat. For name of Us-Kon Distributor nearest you, write us at Rockefeller Center, New York 20, N. Y.

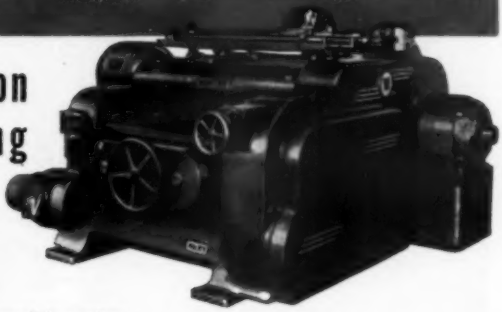
Visit Booth #101, N.A.F.M. Show, Chicago, Hotel Hilton, Aug. 26-30

Mechanical Goods Division

United States Rubber

Nothing Compares with the WHITNEY 97 DOUBLE SURFACER

For quality production and low cost planing



Whitney 97 Double Surfacer
Feeds: 30 to 90 feet per minute
Planes stock ⅛" to 7" thick
Widths, 30" 36" 40" and 44"

The Whitney 97 Double Surfacer, the last word in modern planer design, is built to handle your double surfacing requirements. Its rugged proportions and faster feeds permit it to handle easily the volume production required in today's modern plant. Traditional Whitney accuracy and careful workmanship assure smooth, accurate planing, continuous production, low cost maintenance and the stamina to produce best results under the severest kind of service.

The Whitney 97 will bring to your plant a new conception of production efficiency and cost savings. High production quotas will be maintained and sanding and finishing costs substantially reduced. Investigate today the Whitney 97 for your double surfacing requirements. Write for full particulars. Ask for planer bulletin D 1.

Check these features

- Wedge Construction
- Nitralloy Center Table
- Ball and Roller Bearings thruout
- Motor Raising and Lowering of Bed
- Built-in Variable Speed Feed
- Micro-feed Selector
- Automatic Power Feed Grinder

In our 117th year

Baxter D. Whitney & Son, Inc.
WINCHENDON, MASSACHUSETTS, U. S. A.
Quality Built Woodworking Machinery Since 1837

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FOR MORE THAN 100 YEARS

PLANERS • SHAPERS • AUTOMATICS • VARIETY SAWS • BACK KNIFE LATHES

NO MORE pinched fingers

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SELF-RELEASING DROP LEAF SUPPORT

SMOOTH, SIMPLE ACTION

EVERY WOMAN who owns a table with Wabash Drop Leaf Supports is enthusiastic . . . tells her friends . . . helps you sell more tables. These self-releasing supports are inexpensive, save time and labor, too. They are used by many leading manufacturers who find them an outstanding selling feature. Ask about them.

Ask about Wabash Slides and Folding Leaf Equipment

4844

B. WALTER & CO., Inc., WABASH, INDIANA

Walter of Wabash

Helicopter Companies Specify PENACOLITE® Adhesives for Rotor Blades

Wood sections bonded with PENACOLITE adhesives make this solid-construction blade for Bell Aircraft Corporation's model 61 helicopter.

This hollow-type blade, in process for Vertol Aircraft Corporation, has ribbed construction bonded with PENACOLITE adhesives.

Strength and long life are literally being built into the construction of these rotor blades made by Parsons Corporation of Traverse City, Michigan. For PENACOLITE adhesives are used to bond the various sections into rugged, one-piece units that withstand the toughest whirl tests and gruelling in-flight use.

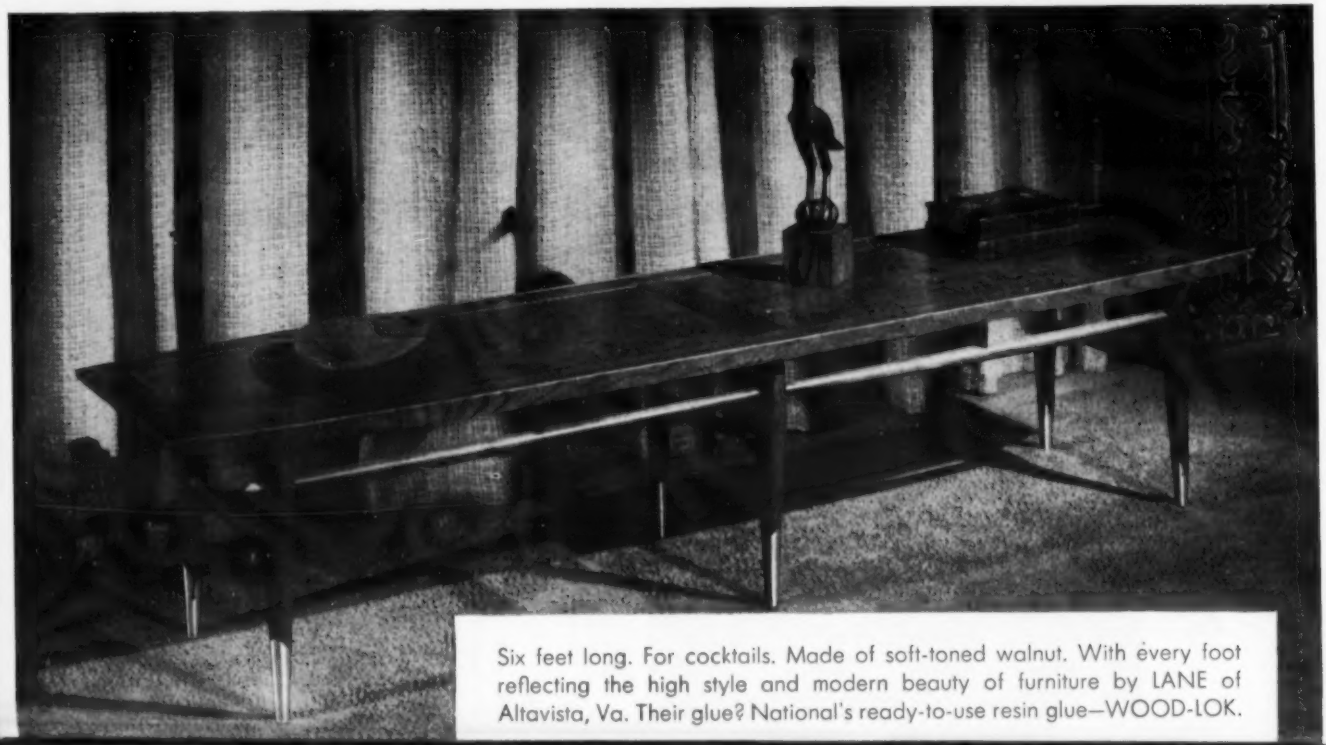
PENACOLITE adhesives are completely waterproof and remain as strong as the woods they join, through all kinds of weather conditions. They resist the shrinking and swelling of wood, and are unaffected by heat, cold, or long exposure. Write for our FREE illustrated booklet on these versatile adhesives and their many uses. Koppers Company, Inc., Chemical Division, Pittsburgh 19, Pa.

KOPPERS

PENACOLITE®
RESORCINOL ADHESIVES

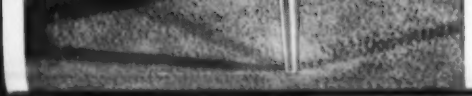
The original waterproof room-temperature-setting adhesive

KING-SIZE! BY LANE



Six feet long. For cocktails. Made of soft-toned walnut. With every foot reflecting the high style and modern beauty of furniture by LANE of Altavista, Va. Their glue? National's ready-to-use resin glue—WOOD-LOK.

made stronger with WOOD-LOK



Six feet long. For cocktails. Made of sun-toned walnut veneers, reflecting the high style and modern beauty of furniture by LANE of Altavista, Va. Their glue? National's ready-to-use resin glue—WOOD-LOK.

made stronger with WOOD-LOK

STRONGER JOINTS
WOOD-LOK strengthens dowel joints with the strongest bond of any type adhesive. Dowel driver requires no nightly cleanup.

GREATER SHOCK RESISTANCE
WOOD-LOK glue lines are nonbrittle. This increases shock resistance. Makes leg and other joints more durable.

LONGER ASSEMBLY TIME
WOOD-LOK allows 5-7 min. for open assembly. Yet it reaches handling strength faster than animal or vegetable glues.

RESYNS®
National
ADHESIVES

CAN WOOD-LOK SPEED UP AND SIMPLIFY YOUR OPERATIONS? Let one of National's wood adhesive specialists confidentially review your joint gluing operations with you at your convenience. Just write to us on your letterhead.

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Extra durable bonds with

LAUXITE* 326

Monsanto's one-package melamine-urea adhesive upgrades skins and doors with outstanding dry strength and high water-resistance!

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*LAUXITE: REG. U. S. PAT. OFF.

Lauxite 326 is specially formulated by Monsanto for hot press gluing of exterior work. This dustless, water-soluble powder assures a lasting bond with a high degree of water-resistance

It is easy to prepare—add only water. Its working life is at least 72 hours at 75°F. Its cure time is fast. It has little formaldehyde odor. Its coverage is high—25-35 pounds for 1,000-square feet of single glue line.

The superior washability of Lauxite 326 makes equipment cleaning easy. Its light-color glue lines help to eliminate staining problems on thin veneers.

Let us tell you how Lauxite 326 can be economically formulated to satisfy your extreme and intermediate durability requirements. Write today for test samples and data sheets. Monsanto Chemical Company, Plastics Division, Room 1152, Springfield 2, Massachusetts, or 911 Western Avenue, Seattle, Washington.

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3-WING CUTTERS

Custom-ground shapes to your pattern from STOCK BLANKS

. . . means extra fast delivery!

Made from solid, high speed steel, all cutting edges finish ground to eliminate decarburization . . . all bearing surfaces finish ground to insure flush seating of washers and tightening nuts. Heat treated and tempered under specially controlled conditions.

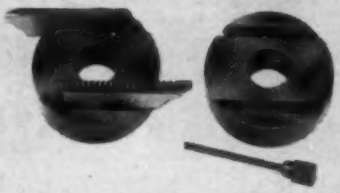
Blank cutters are stocked in the desired widths, diameters and bore sizes. Cutters also available with carbide tips.

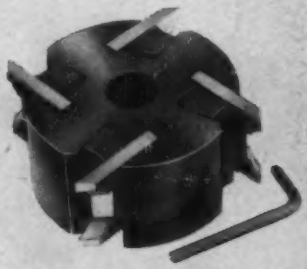
SCHMIDT "Lock-Edge" SAFETY SHAPER COLLAR

and serrated edged knives

DELIVERY FROM STOCK

Easily replaceable worm screws in the collar prevent knives from flying out . . . require far less pressure in tightening and result in greater knife-setting accuracy. Plain grooved collars also available.





SCHMIDT CUTTERHEADS

With high speed steel corrugated Back Knives and Bar stock to your specifications . . . Diameters 2¾" up.

Write us for complete price list on the extensive Schmidt line of cutters and tools, including carbide tipped knives . . . Dealer inquiries invited, too.

Chas. G. G. Schmidt & Co., Inc.

Over 50 years of tool design and manufacture for the woodworking industry

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NOW *Dot brings you*

SUPER SILENT GLIDES

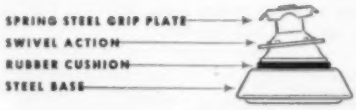
in a distinguished new style

The graceful new conical configuration of United-Carr's well-known super silent glide is perfectly adapted to the clean-cut styling of modern tubular furniture. *Practical* . . . it provides a maximum of flat, smooth under-surface for the protection of floors and carpets. *Distinctive* . . . it is available in nickel or brass finish to match or to complement the furniture with which it is used.

Also available with familiar rounded base.

See us at Booth 9, NAFM FAIR, August 26-30.

FLOATS on rubber, SLIDES on steel
Hardened (or stainless) steel base is insulated from other metal parts by rubber cushion. All noise-making vibrations are absorbed by cushion. New design also ensures minimum exposure of rubber.



TILTS, SWIVELS, LOCKS in tight
Tilting swivel base allows new glide to stand flat on floor or carpet even though legs are mounted at angle. Spring steel grip plate is easily driven into tubing but prevents removal of glide. Available in sizes to fit standard tubing.

UNITED-CARR FASTENER CORP.

31 Ames Street, Cambridge 42, Mass.

MAKERS OF DOT FASTENERS

. . . for increased assembly time of glue-spread veneers

. . . for improved durability

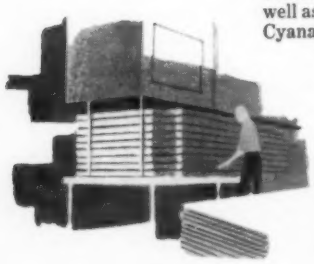
UPGRADE YOUR UREA-FORMALDEHYDE ADHESIVES WITH CYMEL* RESIN 401

You get a really marked improvement in the performance of urea adhesives when you fortify them with CYMEL Melamine Resin 401.

FOR EXAMPLE: Here's what happens as you increase the amount of CYMEL 401 in standard URAC® 180 or 186 glue formulas:

% CYMEL 401 (of Resin Solids)	Maximum Assembly Time (Hours)		Durability (Boil Resistance — Hours Without Delamination)	
	Unextended Formulation	Intermediate Flour-Extended Formulation	Unextended Formulation	Flour-Extended Formulation
0	less than 3	less than 3	less than ½	less than ½
5	12 – 15	10 – 12	1	1
10	15 – 20	20 – 24	2	2
15	20 – 24		3	
20	20 – 24		4	

CYMEL 401 gives you more *versatile* assembly time, too – *shorter* as well as *longer* than possible with unfortified urea adhesives. Call your Cyanamid sales office for complete information.



*CYMEL is American Cyanamid Company's new trademark for its melamine-formaldehyde resins.

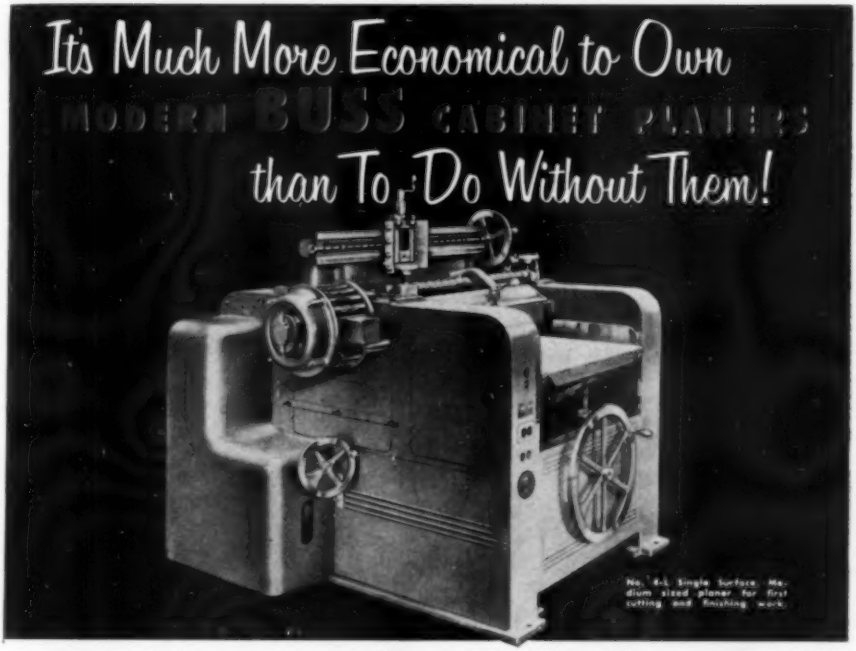
Offices in: Boston · Charlotte · Chicago · Cincinnati · Cleveland · Dallas · Detroit · Los Angeles · New York · Oakland · Philadelphia · St. Louis · Seattle

CYANAMID

AMERICAN CYANAMID COMPANY
PLASTICS AND RESINS DIVISION
32A Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

It's Much More Economical to Own MODERN BUSS CABINET PLANERS than To Do Without Them!

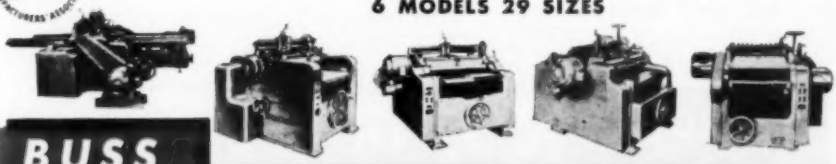


Unless yours is a modern, up-to-the-minute planer, a current BUSS Cabinet Surface Planer in your shop would quickly demonstrate savings which would repay its cost many times over in a relatively short period of time. In the first place it would give you planing of finest quality at three or four times the speed of older planers . . . and that means vastly increased production plus the savings in clean-up operations that quality planing effects. Secondly, you would find that set-up and change-over time would be cut 60 to 70% by our exclusive semi-automatic controls which make absolutely accurate adjustments a matter of seconds instead of long and tedious operations of varying accuracy. Third, you would find that knife grinding and jointing is reduced to a small fraction of the time required on the older planers. And yet, these are only some of the features that make it much cheaper to own modern BUSS Planers than to do without them. Why not investigate? Write for bulletins, now!

WMMA Woodworking Machinery Manufacturers Association

THERE'S A BUSS PLANER TO EXACTLY SUIT YOUR NEEDS

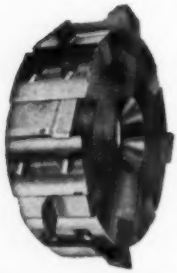
6 MODELS 29 SIZES



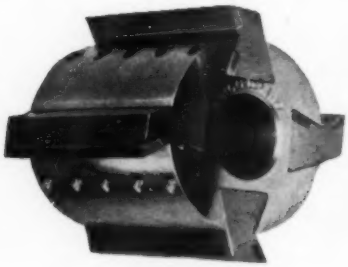
BUSS
SINCE 1869
MACHINE WORKS

PLANER SPECIALISTS EXCLUSIVELY

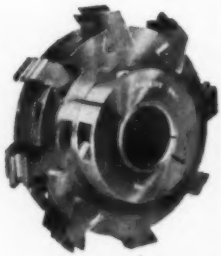
234 EIGHTH STREET • HOLLAND, MICHIGAN



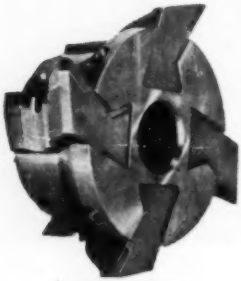
TENONERS (COPE)



JOINTERS

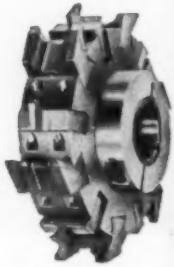


MATCHERS



SHAPERS

MOULDERS



MOULDERS

Increase production and cut costs with

MARCOLOY CARBIDE SYSTEM

The Marcoloy Carbide System insures the successful use of carbide tools on many different jobs.

The system starts with the right design of carbide knives (and cutter heads) for the machine, the cut, the feed, the stock.

Marcoloy tools are precision made. But Marcoloy goes further—the right production, maintenance and sharpening procedures are recommended.

Briefly, that's the complete Marcoloy Carbide System.

You may have our recommendations for the asking.

MARCOLOY CARBIDES

MARCOLOY, INC.

Springdale, Conn.

Black & Decker Vacuum Cleaners provide more cleaning power!

Black & Decker #95 is rugged, heavy-duty vacuum cleaner for shops requiring a unit with top capacity. A new 1-¼ hp. B&D-built motor supplies 20% more power than any comparable unit. Can be used for wet or dry cleaning, as a vacuum or blower. 15′ accordion-type hose enables you to reach hard-to-get-at spots. Rolls easily over rough floors. *Capacity:* 13 gal. wet, 1-½ bu. dry.

Black & Decker #65 is designed for shops requiring a smaller unit than the Black & Decker #95. It has from 70% to 100% more cleaning power than similar-priced units. Large wheels provide easy mobility, 15′ accordion-type hose enables you to reach all nooks and crannies. Compact, versatile, the #65 provides for fast, efficient cleaning. *Capacity:* 3-¾ gal. wet, ⅞ bu. dry.

Accessories: A full line to make your B&D Vacuum Cleaner adaptable to any cleanup job—floor nozzle, floor brush, straight or curved section handle, extension coupling, coupling adaptor, upholstery brush, upholstery nozzle, flat tube nozzle, and 15′ hose.

For a demonstration of either Black & Decker Vacuum Cleaner, see your B&D distributor today or write: THE BLACK & DECKER MFG. Co., Dept. 2707, Towson 4, Maryland.

Look in the Yellow Pages under "Tools-Electric" for Nearest Distributor

B&D Black & Decker®

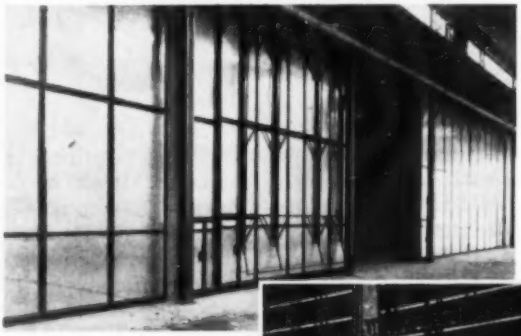
PORTABLE ELECTRIC TOOLS

Wurlitzer compared . . .

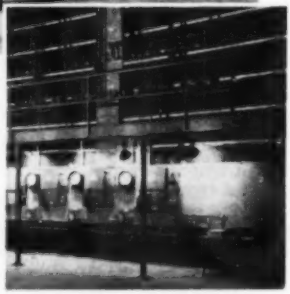
Wurlitzer Chose Standard

PACKAGE LOADED KILNS!

• Rudolph Wurlitzer Company, world's largest manufacturer of quality pianos, had a unique opportunity to compare the performance and features of various types of kilns before deciding which to install at its new plant in Corinth, Miss. Wurlitzer, like so many other leading woodworking firms, chose Standard's well-known direct-driven, internal-fan system *to assure top-quality drying!*



Here's the battery of four Standard Package Kilns at Wurlitzer's new plant in Corinth, Miss.



Operating room for the four kilns is located at the end of the kilns in the boiler room.

WRITE FOR FREE, ILLUSTRATED CATALOG!

STANDARD DRY KILN COMPANY

794 S. HARDING ST. . . . INDIANAPOLIS 21, IND.

BRANCH OFFICE: REDMAN ENGINEERING SERVICE • HIGH POINT, N. C.

Get More From Wood Waste....

...MORE HEAT, more economy, if you burn it

...MORE PROFIT, lower costs, if you sell it

WILLIAMS "No-Nife" HOGS

When used for fuel, wood scrap reduced to chips in a Williams Hog produces maximum heat . . . burns evenly . . . won't restrict flow of air . . . keeps smoke at a minimum. Handling costs are reduced as much as 75%!

When processed for sale as particle board chips, or as sawdust or wood flour, a Williams Hog produces a better quality, more uniform product . . . increases output . . . requires less labor . . . keeps power and maintenance costs low.

Automatic installations for handling wood waste show exceptional savings or profits.

Ask for brochure.

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WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

WE ARE IMPORTANT

The Editor's Page

"Individually, manufacturers cannot match the giants such as General Motors and General Electric, but working together through our trade associations—merchant, manufacturer and distributor—we can do the same things that a Ford or a Westinghouse does. We're more important than many of us think, when we pull together!"

With these words Charles Sligh, chairman of the board of the National Association of Manufacturers, addressed a group of furniture men at the recent Chicago Market. He continued his speech by emphasizing the good condition in which the furniture making industry finds itself.

We are more important than we think! What impact has the entire woodworking industry had on the American way of life? In a large measure we have been effectual in setting and maintaining living standards—the furniture industry illustrates this.

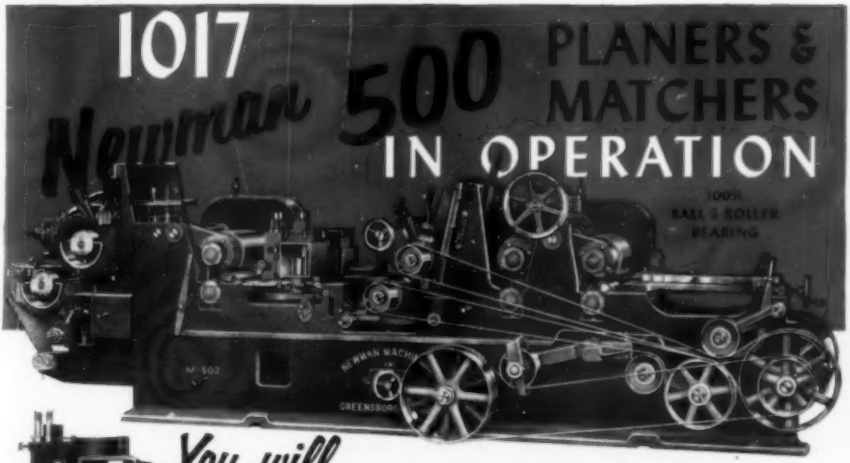
Transportation has been developed from the earliest times with the help of our industry. Turn to the field of recreation and amusement. Again the woodworking industry has pioneered.

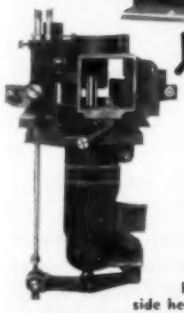
Culturally speaking wood has traditionally been used for the finest musical instruments. Beautiful carved work and marquetry have advanced the aesthetic tastes of our country.

It is only fitting in this month of July when we mark our day of independence and talk of tradition and heritage flows easily, that the woodworking industry recognize its position in American history.

Our industry has played an important part—we are more important than we think. Our future can be just as purposeful and effectual IF we remember to follow Mr. Sligh's advice and "pull together."

1017 Newman 500 PLANERS & MATCHERS IN OPERATION





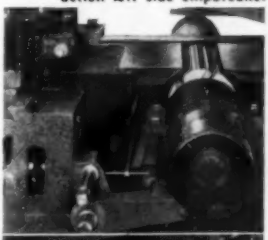
You will want the new M-500 with these FEATURES

- All Sprockets steel—heat treated
- Flame hardened bottom bed plates and pressure bar
- Feed works reversible
- Wear .esistant rigid solid steel long guide
- Chatterproof jointer units
- Simultaneous roll raising device for front bottom feed rolls available
- Quick release for left side head available
- Roller knife setting gauge available

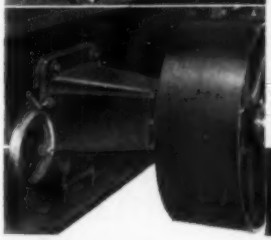
Feeds to 200 F.P.M.

Delivery from Stock If You Hurry

● Heavy duty side head units of long quill design with double action left side chipbreaker



● Massive vibration free bed plate after bottom cylinder



● Hand wheel for adjusting bottom cylinder, also sturdy support for feed shaft.

Newman Machine Co., Inc.

GREENSBORO, NORTH CAROLINA, U. S. A.

POINTED PARAGRAPHS

A delegation of American home builders is now enroute to the Soviet Union to inspect housing in 12 cities—from Leningrad to Tashkent in Asiatic Russia near the border of Red China.

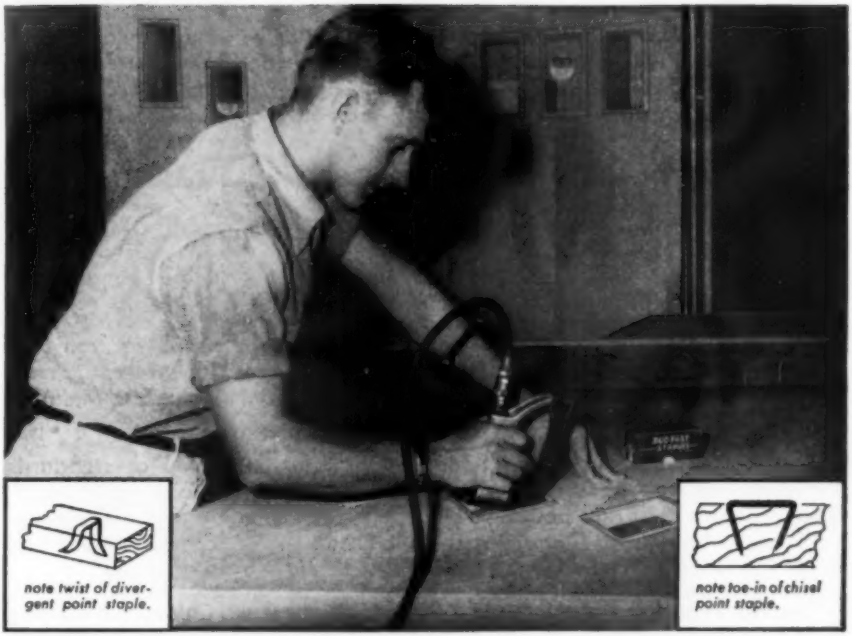
Shippers are alarmed at pressing shortage of freight cars. The situation is four times worse than it was a year ago. Freight car manufacturers are wrestling with 141,000 back orders. National Furniture Traffic Conference, 4-5 Gardner Trust Bldg., Gardner, Mass., is publishing a series of special monthly reports analyzing and interpreting rules of railroad classifications found in uniform freight classification.

What is Beautyguard? This new process for producing cigarette-resistant surfaces is discussed in this month's article "Beautyguard in Use at Period Tables Company."

National Hardwood Lumber Association is planning its 59th annual convention for the Conrad Hilton Hotel, Chicago, October 18-20, 1956.

United Kingdom imports of hardwood lumber from the U.S. totaled 2,805,000 board feet during the first quarter of 1956. This is more than two and one half times the figure a year ago.

WOOD WORKING DIGEST begins a new feature with this issue. Each month we shall include a sheet for your Data File. Clip these sheets and keep at hand for ready reference. Future data sheets will include tables on abrasives, bleaches and stains, finishing operations, etc.



This Stapling Job Required Extra Strong Holding Power

DUO-FAST ROSIN-COATED STAPLES DID THE TRICK!

This worker is stapling moulding to glass lite opening on flush doors, a job requiring more than the normally strong holding power of Duo-Fast industrial staples.

The problem was solved with Duo-Fast ROSIN-COATED Staples. The addition of specially formulated rosin adhesive to the staple legs doubles their holding power—gives them a fish-hook grip.

Thus Duo-Fast ROSIN-COATED Staples, driven by speedy Duo-Fast Air Tackers, are saving money on this application, and doing a quality job in the process.

Duo-Fast has what it takes in Staple Tackers, Staples, *AND SERVICES* to deliver the best results on the stapling operations in your plant.

Write for the free DUO-FAST catalog—it's loaded with ideas, suggestions and how-to pictures.

DUO-FAST

FASTENER CORPORATION
864 Fletcher St., Chicago 14, Ill.

Complete line of • Staplers • Tackers • Staples

Wood models and figurines 6000 years old have been found by archaeologists in the tombs of ancient Egypt. In fact, glued wood panels were interred with the body of King Tut. Most historians agree that the oldest wooden building in the world today is the 1349-year old Horyuji Temple at Kyoto, Japan.

Interested in finishing hardboards? Read the Finishing Section feature by Paul Graham on "Graining Hardboard Cabinets."

Douglas Fir Plywood Association has announced a new structural panel called 2.4.1 and engineered to function as a solid one-piece base over supports on 48" centers.

Wood is making a good impression upon the guests at the Jackson Lake Lodge in Grand Teton National Park, Wyoming. Opened only recently, more than 20 carloads of Malarkey plywoods and approximately 760 Malarkey doors were used in its construction.

Forty plates of mahogany figures and patterns, accepted as standards for specifying mahogany veneer and plywood, are reproduced with descriptions in a new 32-page booklet—"Figure Types in Mahogany." It is available for $1 from the Mahogany Association, 666 Lake Shore Drive, Chicago, Ill.

The Hardwood Plywood Institute, 600 S. Michigan Ave., Chicago, is offering a 50c template for use in designing and drafting hardwood plywood projects. Included with the template, which has calibrated slots for marking on 16" to 48" widths and 3' to 12' lengths, is a guide booklet on the selection and use of hardwood plywood.

Charles R. Sligh, Jr., Grand Rapids manufacturer made the following statement at a dinner attended by members of the National Wholesale Furniture Association. "We should be well ahead at year's end. The spring drop in automotive sales and production had the effect of giving people more money and more credit for furniture."

When furniture manufacturers take the same approach that the automotive industry has to style, we can expect business to be good. This thought was expressed by Raymond Reed during the Chicago market.

Interested in carbide tools? Do not fail to read the first of a three part series on carbide tools which appears in this issue.

Letters to the Editor appears on page 34. If you are interested in contacting any of these firms, write to the editor and we shall be glad to furnish names and addresses.

NEWMAN K-16

Tilting Arbor VARIETY SAW

Rips to 48" wide

DESIGNED for YOUR PROFIT

Handwheel locks both sides of fence simultaneously.

Guard and splitter automatically tilt with saw blade. Guard has anti kick-back fingers.

All cast iron base and table.

Direct connected 3600 R. P. M. 5 H. P. motor. Full 45° tilt of saw with positive lock for holding tilt.

Micrometer double faced rip fence with rack and pinion adjustment permanently aligns fence with saw blade and allows cuts to full 48" wide.

Price **$1,090.00** for standard machine. This unusually low price is an introductory offer for a limited time only. $195.00 additional for rack and pinion fence. F. O. B. Greensboro, N. C.

Standard Machine

DELIVERY FROM STOCK SUBJECT TO PRIOR SALE. WRITE FOR DESCRIPTIVE LITERATURE AND COMPLETE QUOTATION.

NEWMAN MACHINE CO., INC.
GREENSBORO, N. C.

Comments

FROM THE NATION'S CAPITAL

Of great concern to various groups in Washington, and reaching out across the country, is the status of the GI loan program. The National Association of Home Builders has urged Congress to extend the GI Home Loan Program for World War II veterans until "such a time as a new single mortgage financing system can be provided for veterans and non-veterans alike."

George S. Goodyear, Charlotte, N.C., and first vice-president of the National Association of Home Builders told the Senate Labor Committee that, "Home builders recognize that consideration should be given to termination of the guaranty of loans for World War II veterans sometime within the next few years."

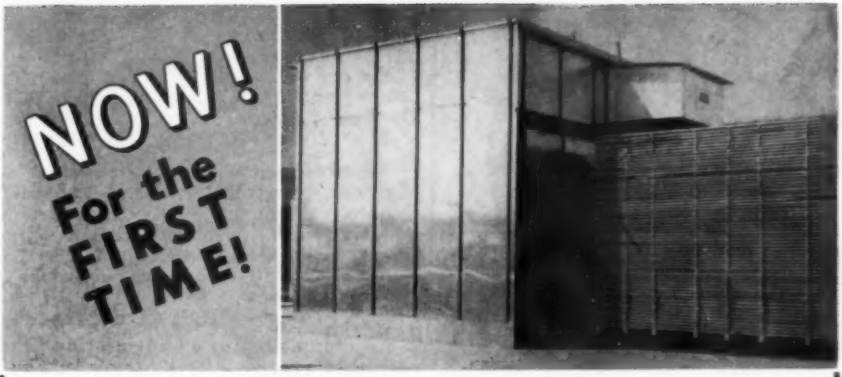
At present the Senate Labor Committee is considering various measures to extend the program beyond July 25, 1957. A bill has been introduced in the house along the lines of extending the program with a single mortgage financing system. However, it is considered unlikely that the present Congress will act on it prior to adjournment later this summer.

Key man in Congress is Rep. Olin Teague (D.Texas), Chairman of the Veterans Affairs Committee in the House. He vigorously opposes any extension, wants to substitute his own bill.

The U.S. Department of Commerce has released several commercial standards. Obtain a copy by writing to the Department, Washington 6, D.C.

Commercial Standard 205-56, wood casement window units, has been released. The standard provides minimum specifications for casement frames and sash, operating mechanism, weather-stripping, storm sash and screens. The assembly of the wood casement unit as well as material, construction, tolerances and grading are covered.

CS204-56 covers wood awning window units. This standard provides minimum requirements for awning windows and projected awning and stationary sash, including the frames, operating mechanism, weatherstripping, and storm sash and screen.



A SMALL KILN

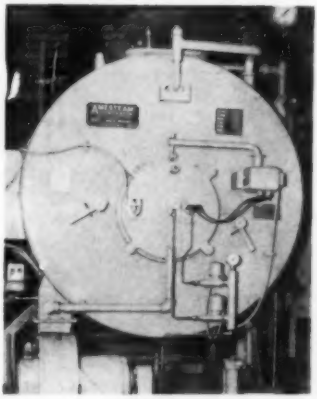
500 to 5000 Bd./Ft. Capacity

This PACKAGE includes:

1—Moore Kiln Equipment

2—Moore Prefab Kiln Building

3—Direct heat (gas or oil) or automatic steam generator



Automatic steam generator for use with Moore Kilns.

The total price is one you can afford. Write for details.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

JACKSONVILLE FLORIDA · BRAMPTON, ONT. CANADA · VANCOUVER, B. C. CANADA · NORTH PORTLAND OREGON

Letters To The Editor

"I believe sometime ago you printed an article or series of articles on electronic gluing of wood. We would very much like to have four reprints of those articles if possible."

—L. E., Ill.

"I want to congratulate you on the wonderful job you did in the article on plywood packaging for the June issue. Would very much like to obtain 500 reprints of this article."

—*D. W., Mass.*

"If possible please send to me 15 copies of the article on Wood Finishing Abrasives and their use. We wish to use this article as further sales training helps for our woodworking men."

—J. K. S., N.C.

"We are in the market for a used machine for manufacturing hardwood pail or bucket handles."

—*M. P. G., Tex.*

"We need complete information on a hardboard factory: grinders, hydraulic presses, aluminum cauls, circular saws or band saws, kilns; and complete plans for a factory of an approximate production of 500 thousand square feet per month."

—J. R. I., Central America

"We are in need of an engineering firm to make a survey of our blower systems, which we have just installed."

—*A. W., N.J.*

"One of our customers in Mexico wants a machine to make the groove on the inside of Pepsi Cola box sides and the tongue on the dividers. Can you advise us the name of the manufacturer of machinery for this purpose?"

—I. C. B., Tex.

CARBIDE TIPPED Dado Heads

NOW, ONE sharpening takes the place of FIFTY.

This proven economy of Carbide Tipped Tools is now available to you for your grooving operations, either with or across grain, in any kind of wood with the New Blade Carbide Tipped Dado Head.

Dia.	Width of Groove	Price Ea.
6"	13/16"	$ 60.00
8"	13/16"	75.00
10"	13/16"	110.00
12"	13/16"	164.00

Dia.	Thickness	Price Ea.
6"	1/8 or 1/4	$6.00
8"	1/8 or 1/4	7.50
10"	1/8 or 1/4	9.00
12"	1/8 or 1/4	12.00

Write for catalog of Carbide Tipped and Solid Steel Circular Saws and Dado Heads. Dealer inquiries invited.

Save money on all your cutting operations

FREE IDEA BOOK SHOWS HOW

Page after page of on-the-job photographs, job-tested methods, explanations, time-and-motion studies, showing . . .

- How to reduce capital investment 60% or more!
- How to save 75% in floor space alone!
- How to make possible fast, efficient, straight-line materials handling for production-line cutting operations!
- How to give your operators unmatched job safety!
- How to make 17 different, popular saw and dado cuts . . . in less than 17 minutes!
- New and faster ways to make 17 *special* cuts!
- How to upgrade quality of work—*automatically!*
- And much, much more!

See why the AMF DeWalt® is used in hundreds of thousands of cutting operations throughout industry . . . why an AMF DeWalt for *your* cutting jobs is one of the smartest investments you can make.

Another AMF Product
DEWALT POWER TOOLS

DeWalt Inc., Dept. WD-56-7, Lancaster, Pa.
Subsidiary of AMERICAN MACHINE & FOUNDRY COMPANY
Please send me FREE IDEA BOOK for INDUSTRY.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

Why Carbide Tooling?

By

Robert Chateauneuf

This is the first of three articles which will appear under the above title. This article treats with the abrasiveness of the wood derivates and the outstanding quality of carbide wear resistance. We will see that each carbide application presents its own problems and change-over should be well planned.

Future articles will deal with tool design, wood machining characteristics and, most important, cutting techniques.

IN the mechanical woodworking industry, the cutting tools employed constitute an important factor. For this reason, it seems strange that research so far has not directed more attention to the machining of wood. This may be due partly, to the relative ease with which wood can be machined as compared to the cutting of metals and to the difficulties encountered by research technique because of the non-homogeneous structure of wood. For these reasons, the lack of precise research results has become increasingly evident. Manufacturers of woodworking machinery and tools as well as their users urgently require information.

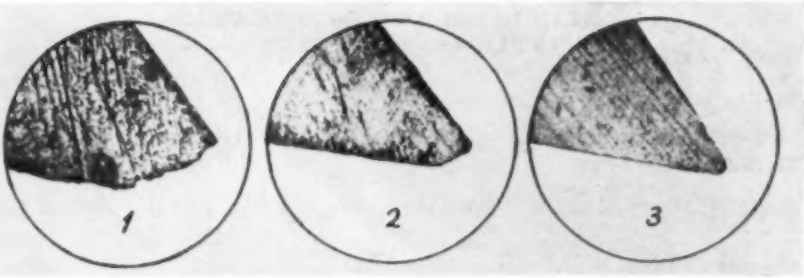
Man has always been in search of materials to use for cutting and forming, for wear resistant parts and for the many other operations needed to produce the things of life. What we can make and at what price depends to a great extent upon the material of which cutting tools are made, and it was not until the development of tungsten carbide that significant progress was made with perishable tools.

The start of this important metal is credited to a French scientist, Henri Moissan. However, not much was done with his discovery until the German metallurgists during World War I, in their search for a substitute for diamonds, made the first use of a material called cemented tungsten carbide to draw tungsten wire. Real progress took place during the second war for such other jobs as the machining of cast iron, steel, wear applications and now if applied correctly it is an ideal tool for our woodworking industry.

Cemented carbide as a whole is very similar to steel in appearance. It is almost unbelievably hard, so hard in fact, that the diamond is about the only material that will scratch it.

The following properties of Tungsten Carbide tools are the answer to our automation century.

- Extreme hardness both at room and high temperature. It is as hard at 1400°F as high speed steel at 70°F.
- High resistance to abrasive wear.
- Relatively low resistance to impact.



From "Cutting Force in Woodworking," by Eero Kivimaa.
Magnification 100 times. Knife angle 35°. The three knives operated 6,500 lineal feet in birch.

Tungsten carbide has a variation of grades for different purposes, but grades come within a very narrow range on any hardness scale (The range of hardness does not exceed 7 Rockwell/A 60 kgm. load).

You ask why do we need such a hard tool to machine such a soft material as wood?

Tool life is not proportional to the material hardness to be machined but to its machinability, hence some very soft materials are more abrasive than harder ones such as phenolic and urea plastics as compared with cast iron and steel. In wood the abrasiveness varies with the amount of mineral particles remaining in the lumber, thus a softer wood, such as cedar, may be more abrasive than a harder type of wood. Considering these reasons, carbide has become a must when working on high production with synthetic materials, laminated wood products and second growth wood which carry mineral streaks.

The picture shows a cross section of the cutting edge of a carbon steel knife (1) high speed steel knife (2) and tungsten carbide (3) (Grade C-10) after a dulling test.

Now that you know high speed steel advantages over carbon steel cutters, you would not care to go back to the use of a carbon steel tool. The difference between the carbide properties and high speed steel are still greater.

The tool life depends, mainly, on its material hardness and the ability to retain it. The grinding of hardened carbon steel requires extreme care to ensure that the immediate cutting edge is not overheated causing loss of hardness. Also, the heat generated by the cutting operation itself can, under some conditions, exceed the thermal resistance particularly in the case where the knife has become blunted and operates in the wood with no cooling air around it. such as a drill. Understanding the properties of the material is very important when considering different grades of carbide for a specific application.

Tests were conducted (by L. A. Patronsky and T. C. Weill) on materials purposely selected because they had presented difficult machining problems in the past. Soft maple, chipboard, standard and tempered hardboard (one smooth face and one screened face) were the materials selected as a basis for tool wear comparison.

The four materials were bonded with cold liquid animal glue under 100 lbs.

WEAR LANDS ON DIFFERENT KNIVES IN FOUR ABRASIVED MATERIALS

TYPE OF BLADE	HIGH SPEED STEEL	CARBIDE GRADE C-11	CARBIDE GRADE C-9
LINEAL FEET	286	1490	4160
KNIVES HARDNESS	83-85 R/A	88 R/A	92 R/A
MATERIAL	WEAR LAND	WEAR LAND	WEAR LAND
Soft Maple	.0002	.0002	.0005
Chipped Board	.0074	.0036	.0034
Standard Hardboard	.0027	.0106	.007
Tempered Hardboard	.0255	.0155	.0105

NOTE: The carbide grades are the C.I.S.C. designation and not the trade name classification. For reference see a special table from a carbide supplier.

pressure per square inch. It was assumed that each material passed the same spot on the cutting knife on each pass. At 25 knife marks per inch and a depth of cut of 1/32" the cutting of the four materials was continued until the surfaces produced showed that the tool required sharpening.

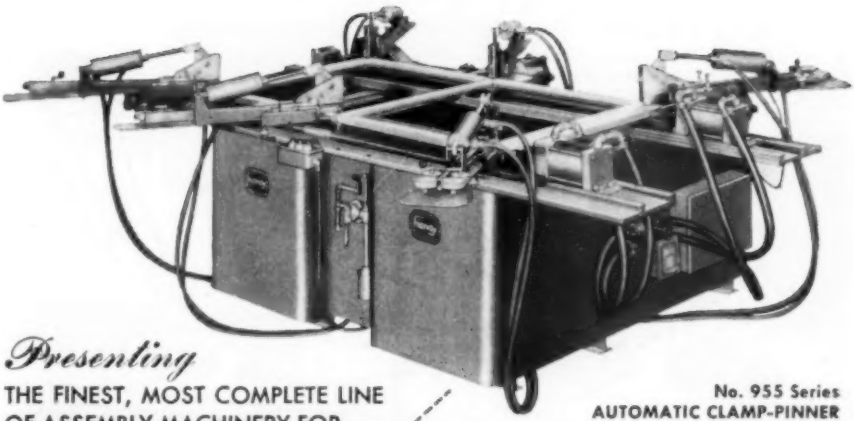
The same test was made with a steel cutter and two grades of carbide cutters. The footage and the wear land were measured and are as shown in Table 1.

The dulling test indicates the comparative abrasiveness of the four materials tested with three types of cutters. The high speed steel blade cut 286 lineal feet; the grade C-9 blade, 4160 lineal feet or about 14.5 times as many lineal feet as the high speed steel blade with an average wear of only one quarter of that of the steel blade. In other words, in terms of wear resistance, which is relative to both the number of feet cut and extent of wear on the cutting edge, the grade C-9 proved to be 56 times as wear resistant as steel. This would make grade C-9 almost five times as wear resistant as grade C-11 on this particular application, while grade C-9 is only 3.5 to 4 Rockwell/A harder than grade C-11. Hence the importance of specifying carbide grades to the supplier.

We can see how important it is to use knives with a maximum of hardness; even with steel cutters, a few Rockwell will make a great difference in the performance.

Although the grade C-9 is more wear resistant, grade C-11 exceeds it considerably in shock resistance. This would be an important consideration where high shocks might be encountered, such as cutting across foreign matter in wood. Our firm is using successfully carbide grade C-9 on most of its applications. Grade C-10 (hardness 91 R/A) which will have properties somewhere between grades C-9 and C-11 is sometimes used but shock resistance not being a major problem, we have never had the occasion to use grade C-11. It is well to bear in mind that what is gained in shock resistance is lost in wear resistance.

In general, carbide tooling will exceed by far the high speed steel in



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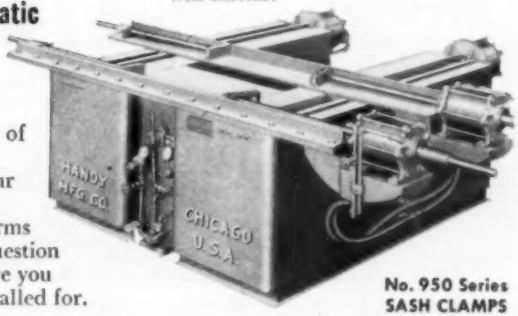
Press the button — and before you can *think* Jack Robinson — the sash is clamped, squared and pinned. All you do is drop sash in and take them out; and you can't do it fast enough to keep up with the machine. Setup of clamp and pinners simultaneously is done by power in seconds; so, for the first time, you actually get the full production potential every hour of the day. Just think how your costs will shrink!

NOW **fully automatic push button clamping and pinning**

There are times — and this is one of them — when something so much better comes along you realize your present equipment is obsolete. Handy assembly equipment performs so exceedingly well, it will be a question only of how few months it will save you back its moderate cost. Action is called for.



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You can tell at a glance why these clamps greatly outperform even last year's model. The operators have no obstacles—the work is right below them for easy, fast reach. There's more power than you'll need, and it's applied just right in both directions. Change from size to size is done quickly, and by power, if you wish. Handy Power-master Clamps have what you need now.

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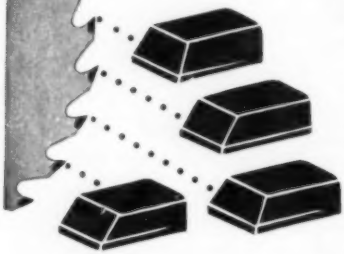

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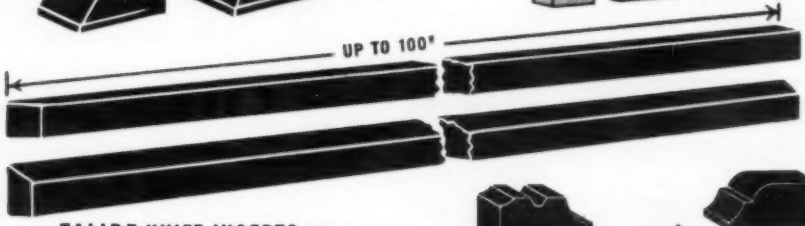
stay sharper · cut longer · lower costs

Available in 5 standard grades and in many sizes and shapes, for high production service on every type of woodworking operation, including the cutting of insulation board, hard board, fibres, plastics, laminated wood, etc.



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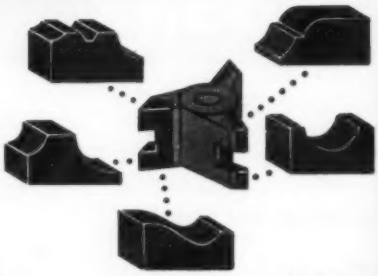

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TALIDE ROTARY CUTTER BLANKS
Preformed to accurate tolerance with minimum stock—and to any form or shape desired.

wear resistance qualities. Translated in terms of efficiency and economy to the user, this could be termed a saving in machine down-time and tool cost. Although the initial costs of carbide tools are higher, the longer tool life far outweighs this factor, also the carbide blades maintain their cutting edges longer even though original sharpness is less than high speed steel. A high degree of sharpness is difficult to maintain and it is not a necessity because such a sharpness is lost very rapidly. The high consistency of the carbide to keep its sharpness contributes to maintaining a high standard of quality at a minimum of manufacturing cost.

(To Be Continued.)

1/64 3/64 5/64 7/64 9/64 11/64 13/64 15/64 17/64 19/64 21/64 23/64 25/64 27/64 29/64 31/64

DECIMAL EQUIVALENTS

1/64	.015625
1/32	.03125
3/64	.046875
1/16	.0625
5/64	.078125
3/32	.09375
7/64	.109375
1/8	.125
9/64	.140625
5/32	.15625
11/64	.171875
3/16	.1875
13/64	.203125
7/32	.21875
15/64	.234375
1/4	.250
17/64	.265625
9/32	.28125
19/64	.296875
5/16	.3125
21/64	.328125
11/32	.34375
23/64	.359375
3/8	.375
25/64	.390625
13/32	.40625
27/64	.421875
7/16	.4375
29/64	.453125
15/32	.46875
31/64	.484375
1/2	.500
33/64	.515625
17/32	.53125
35/64	.546875
9/16	.5625
37/64	.578125
19/32	.59375
39/64	.609375
5/8	.625
41/64	.640625
21/32	.65625
43/64	.671875
11/16	.6875
45/64	.703125
23/32	.71875
47/64	.734375
3/4	.750
49/64	.765625
25/32	.78125
51/64	.796875
13/16	.8125
53/64	.828125
27/32	.84375
55/64	.859375
7/8	.875
57/64	.890625
29/32	.90625
59/64	.921875
15/16	.9375
61/64	.953125
31/32	.96875
63/64	.984375
1	1.000

Success Story Of Resin-Bonded Wood Waste

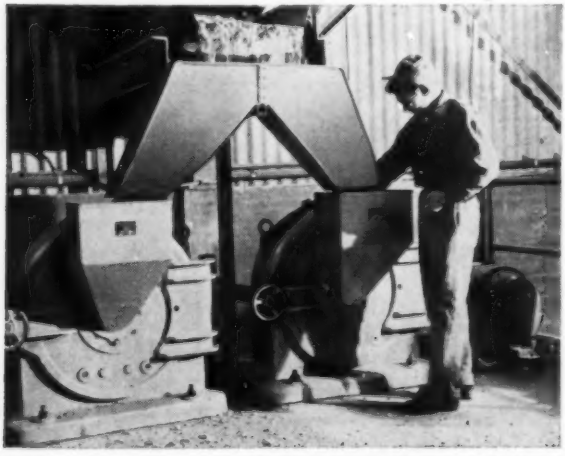
By Dr. L. F. Bornstein

Technical Director, Synvar Corporation

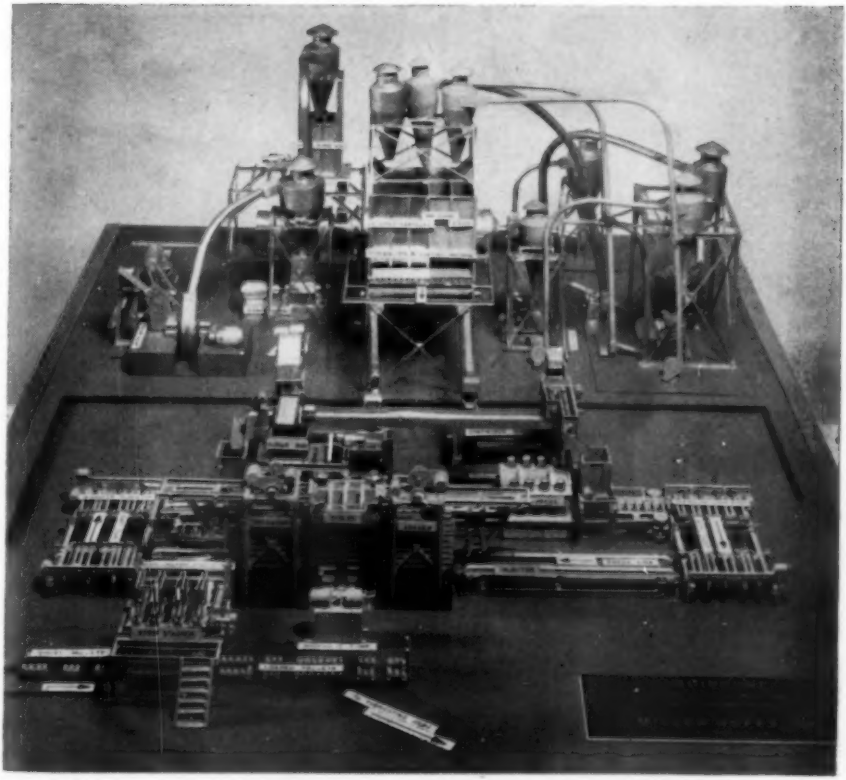
SPECIALISTS in the woodworking and plastics fields have scored an economic victory in developing techniques and resin binders for utilizing wood waste, and at the same time have solved the international and long standing problem of how to dispose of unsightly woodchips and sawdust mountains. The achievements in wood waste utilization have been spectacular to the point that a shortage of waste may develop and more of the "waste" will have to be produced to meet the demands of the woodworking industry.

The success story of resin-bonded wood waste is not confined to the chemist and the woodworking specialists. Industrial designers, engineers and technicians have contributed to the manifold problem of finding the right application for wood waste, and developing manufacturing techniques to produce particle board and molded products to compete with clear lumber which was becoming more scarce and expensive.

We are not concerned with the chemical method of degrading the cellulose structure of wood. This article is confined to the utilization of wood waste in its existing form by mere mechanical preparation for further processing with resin binders.



Secondary chip grinding. Taken at plant of Dixie Chipboard Co., user of the Kreibaum process.



This model shows the Miller Hofft process from shredders to finished panels.

Applications

The most obvious application of particle board was as a replacement or supplement for lumber or plywood in furniture manufacture and other industries. The secondary outlet was the manufacture of molded articles. When applications were established and handmade sample products tested and accepted, engineers and designers started work on the development of a process adaptable to the American economy with respect to production, speed and operating costs. Some methods originally were developed in Europe (mostly in England, Germany and Sweden) and modified to meet our requirements. Other processes were originated in the United States. Almost all these new methods are concerned with the utilization of coarse waste in the form of chips or shavings. Fine wood waste, such as wood flour, usually prepared specifically for this purpose, is processed more or less in the conventional molding method.

Chipboard

At the present time, the chips used in the manufacture of chipboard are of the splinter type produced in ham-

Board made according to the Kreibaum process at the cutoff saw.

Stacking tubular chipcore—Kreibaum process.

mer type shredders and measuring approximately ⅛" in diameter and ½" in length. A quality chipboard requires that the established chip size be maintained in a close range. An excess of oversized or undersized particles will weaken the structure. Therefore, these are removed by screening prior to processing. Even more important than the size of the chips is their shape. Certain shapes such as wafers or flakes seem to give a better board for structural purposes than, for instance, the splinter type.

Chipboard is produced by two basic methods—the batch type and the continuous extrusion. In the batch type method, the mixture of chips and binder is formed into a board in a press under stationary pressure. The batch remains under pressure between heated platens long enough to set the binder. The board is then removed from the press and finished by trimming the edges, cutting, etc. This basic operation is usually further elaborated, involving the handling of the chips, mixing with the binder, loading and unloading the press and finally handling the finished board. A well known process utilizing the press operation principle was developed in this country by Miller Hofft Company of Richmond, Virginia. This process consists of the following operations.

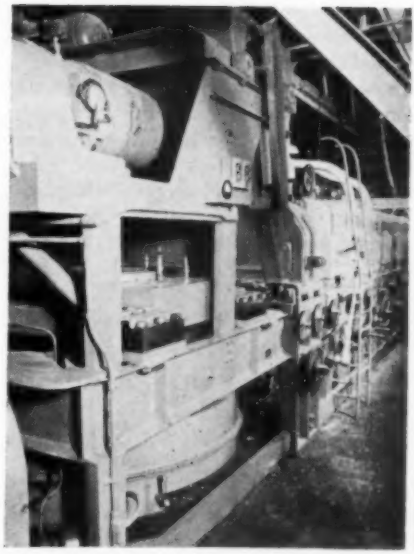
- Wet wood waste, in original form, goes through the hog, then through the drier which reduces the moisture content.
- Wood waste is reduced to proper size in the shredder and classified by means of screens by size and shape for processing.
- Fines are discarded and oversize particles reground.
- Proper wood waste collected in bins and fed into the mixer under controlled conditions and then mixed with resin.
- Wood waste resin mix is fed onto a spreader and conveyed through precompression rolls into multiplaten hot press where the board remains

for a pre-determined time required for curing.

- Boards are removed for further processing or use.

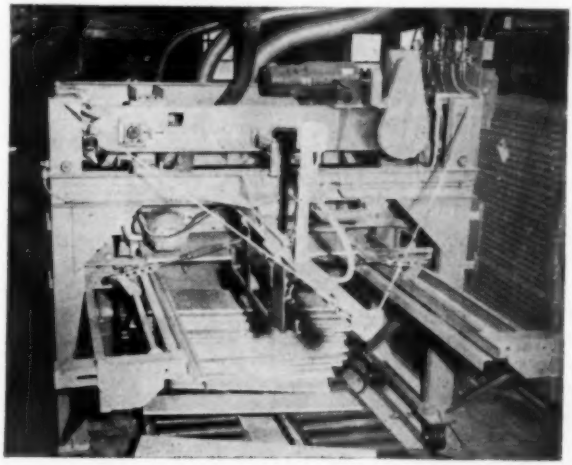
Most efforts, however, were spent on the development of a fully continuous extruding process to obtain the greatest economy by increasing the speed of operation and reducing the amount of labor. Most of the ideas on the extrusion process were developed in Europe, perfected here and adapted to our conditions.

In the extrusion process, the mixture of chips and binder is forced to move continuously between rolls, platens or other means to exert the pressure required to form the board and furnish the heat required to set the binder. There are essential variations in the engineering of the extrusion process. One method applies a horizontal set-up, the other a vertical one. The horizontal principle is represented in this country by the Lane Company process, which is gaining in importance. The principle of the Lane process is as follows:



The extrusion press from the front or drive end, with the automatic saw frame at the far end.

"A thin hammer-type hog is used to prepare the chips, and the fines are separated in another operation. The resin is mixed in by spray to achieve uniform and economical distribution.



Board emerges from the extrusion press and is being cut off by the saw without stopping.

The resin-wood waste mix is then compressed in a continuous way in the extrusion machine. The speed of extrusion and the temperature is carefully controlled by means of indicators spaced every few feet along the machine. As the board emerges from the machine, it is automatically cut to the desired length by a cutoff saw equipped with a limit switch and synchronized to take into consideration the pulsating motion of the board, permitting the saw to cut on a straight and true line. The board is then finished by veneering or by surface planing for further processing."

The vertical principle was developed in Germany and is known as the Kreibaum process. Many concerns all over the world are utilizing this process in producing chipboard. (The Dean Company of Chicago represents this process in the United States.) One of the features of this process is the possibility of producing a tubular type board, thus saving on weight. The basic details of the Kreibaum process are as follows:

"Wet, 'as it is,' wood waste goes through a wood hashing rotor and is pneumatically conveyed to a chip bin. From there it passes through a grinder and travels through a rotating dryer to reduce the moisture to the requirements of the process and is pneumatically conveyed to a bin on top of the building. From there, the chips are fed by gravity into a mixer and a pre-determined amount of resin added. The wood waste-resin mix is then extruded through a vertical hot press. The emerging board is cut to the desired size and veneered or used as is. The tubular type board is extruded over heated pipes."

There are also in use, other modified processes utilizing the basic principles mentioned above (Chipcraft Co., U. S. Plywood, Long Bell Lumber Co. and others). Some new processes or new improvements are also being engineered (Continu-bond process).

Board produced by these various processes differ in certain respects—mostly due to the orientation of wood fibers in the finished boards—consequently, they exhibit some differences in characteristics. Properties of a typical chipboard produced in this country are:

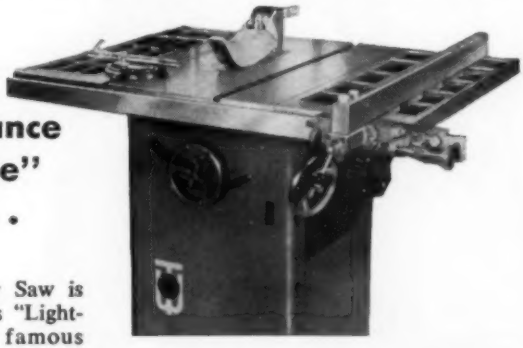
Density, lbs./cu. ft ....about 39.6
Transverse modulus ....about 2,500
Tensile strength p.s.i. ..about 1,000
Shear strength p.s.i. ....about 2,000

Two basic raw materials are essentially involved in the manufacture of any wood waste product—wood particles and the resin binder.

Wood particles available for further processing differ both in character and origin, as well as in the size and shape. It has been established that variations in wood species do not have any significant effect on the properties of the finished board. It is fortunate that almost any species can be converted into a usable product. Furthermore, even wood waste obtained from wooden articles already processed and rejected can be skillfully blended in and reprocessed. Although in producing chipboard a mixture of various species can be successfully used, in other processes —for instance in the manufacture of molded articles—the greatest possible uniformity of wood character (species) is required. Therefore, in chipboards the uniformity of particle size and particle shape is more important than the uniformity of wood species. In molded

(Continued on page 50.)

WALKER-TURNER



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This rugged 10" Tilting Arbor Saw is ready for anything. In fact, this "Light-Heavyweight" has become famous throughout the country in large and small industries, pattern shops, woodworking shops — and in vocational training departments of schools. It cuts production time and costs just as efficiently as it cuts wood, plastics or metals.

Specifications: Capacity — cuts 3⅛" deep with 10" blade; 2½" at 45°; 1⅛" with 6" dado . . . Table is 45¾" wide and 32½" deep, with extensions . . . Rip fence is so accurate you don't have to waste time on test cuts; single lever locks front and rear; spring loaded pins assure automatic squaring . . . Available with 1 hp single phase, or 3-phase motor.

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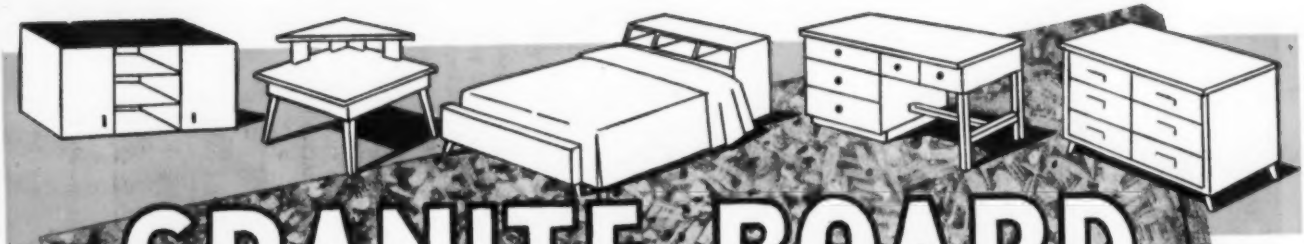

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WORKS EASILY IN ANY DIRECTION WITH

This material has been fully proved through practical application by some of the countries largest manufacturers in the furniture, woodworking and

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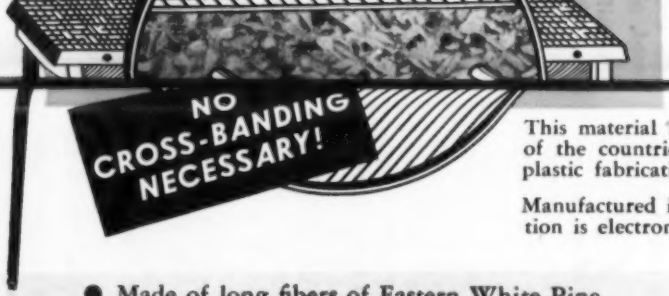

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Manufactured in the most modern of plants, Granite Board's entire production is electronically controlled.

- Made of long fibers of Eastern White Pine Hot Pressed — Solidly bonded — no blistering when veneered or plastic laminated.
- Uniform density — pressure controlled — nail and screw holding characteristics are excellent throughout entire surface areas and edges — no soft spots or core voids!
- Great dimensional stability — no cross banding required!
- Uniform thickness — Fine grain sanded both sides to within a maximum deviation of ± .005" of specification.
- Perfect surface both sides for glueing or plastic laminating — Granite Board is ready for use on arrival — no surface-glaze or irregularities to remove.

SIZES: Standard—48½" x 96½" • Thicknesses—Regular Density—7/16" to 1-3/16" in 1/16"multiples. Extra Heavy Density ½" to ¾" in 1/16" multiples.
Special thicknesses and sizes to 48½" x 144½" are available.

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Vinewood 2078

articles, the character of the wood species matters.

The best illustration of the acceptance and importance of particle boards as a new structural material is the fact that wood is being cut purposely into definite particle shapes with the specific idea of improving the appearance and properties of the board. Special cutting machines and tools have been developed for this purpose. These new wood waste shapes include a board manufactured by Long Bell Lumber Co. and U. S. Plywood. These larger size, coarse particles are mostly converted into such articles as boards, panels and cores, but are seldom used in forming smaller articles. The smaller articles are made in a molding process.

Molding Wood Waste

Wood waste available for the molding process is usually in the form of sawdust and/or wood flour ranging from 20-150 mesh. This fine form is required because of the appearance of the finished article, as well as the finishing requirements, such as coating or painting. Wood flour was manufactured and used for many years as a filler in industries such as rubber and linoleum manufacture. However, it was mainly used in combination with various resins and plastics in the molding of a variety of household articles, toys, automotive, electrical, and other industrial applications. In these articles, wood flour is used as a filler to improve the mechanical properties: it is the reinforcing agent. However, the resin is the major component. The new approach is the utilization of wood waste as the major component with a relatively small amount of resin as a binder to keep the shape and to give certain properties.

The basic process in these two molding approaches is very similar. The difference in wood waste molding is that the filler is not impregnated with resin and the cellulose character of the wood not substantially changed by processing. A dry mix of wood flour and resin binder is loaded into the molds representing the shape of the article to be produced. The mold is placed in the hydraulic heated press and subjected to simultaneous compression and heat to cure the resin binder. The pressure requirements vary from 300-1,000 p.s.i., and the temperature from 250-350°F. After a few minutes, the article is removed from the press. Novelty articles produced by molding fine wood waste have an excellent surface appearance, smooth and uniform, usually resembling wood in color and texture, and do not require any additional finishing. They can, however, be painted, lacquered or covered with plastic sheeting. The wood waste molded products are characterized by good strength, uniformity, good machineability and excellent dimensional stability. The typical strength figures of the molded wood waste fall in the range of:

Density ..... 0.6-1.0 gms/cc
Modulus of rupture 4,000-5,000 p.s.i.
Flexural strength ..3,000-5,000 p.s.i.

Needless to say, these properties will vary greatly depending on the amount of resin, type of resin, pressure applied and other conditions. Although it is important in molded wood waste that the wood flour granulation does not exceed certain limits and uniformity, it is much more important that the wood flour, or a major part of it, represents only one species of wood since the affinity of resin to wood varies with the species. If the species vary considerably, a selective pick-up of the resin

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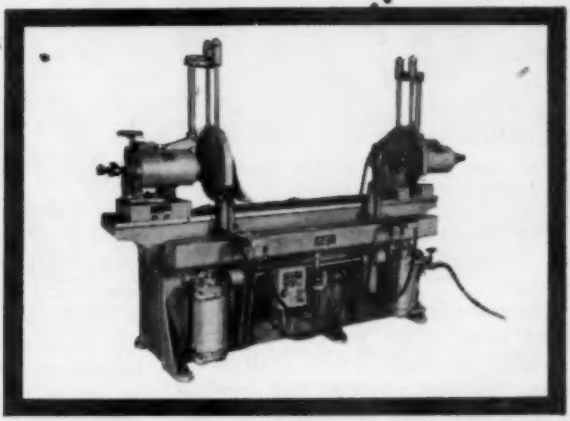

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It's an advancement of the Bell Double End Miter and Cut-off Saw used throughout the world in every conceivable type of woodworking plant. In addition to the features that have made this machine the "standard of the industry", the new 112 features include

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- A **complete** control panel, incorporating a master stop, set-up button, time delay adjustment to set dwell time, **automatic or manual cycling,** and individual head buttons, **ALL** located at the operator's finger tips and operating from a single 110 volt circuit.
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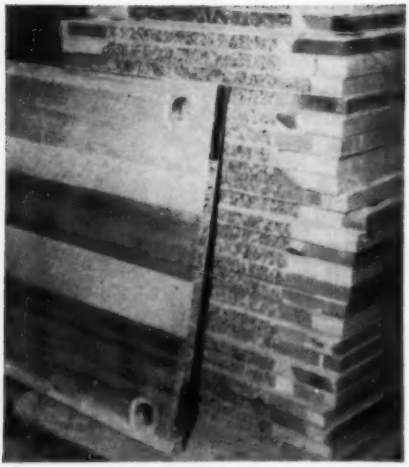


At the Lane Company, particle board combined with lumber and veneer.

binder would take place with a resulting reduction of the strength of the product.

Many articles are being molded from wood waste at the present time, such as salad or fruit bowls, chair-backs, trays, dish-ware, croquet and bowling balls, shuffleboard discs, etc., but the ones gaining the widest acceptance are toilet seats. Most toilet seats have been made from wood or molded from hard rubber or plastics. Wooden toilet seats require a number of operations, a number of tools and machines and expensive labor. Plastic seats, on the other hand, require expensive raw materials and expensive equipment, such as compression or injection presses equipped for high pressure operation, and heavy duty molds. The relative simplicity of the molding process from wood waste, low cost of raw materials and attractive properties has had a definite effect on the almost complete displacement of wooden seats and a very substantial replacement of the plastic ones. An estimated 5-10 million lbs. of fine wood waste is being used monthly in this one application.

Binders

The successful conversion of wood waste into usable commercial articles depends upon suitable resin binders. Several binders have been suggested, tried out and even used on a limited scale, such as binders of the silicate, starch or cement type. The products obtained with such binders did not meet the present standards and have only very limited use. True wood waste utilization is made possible by properties that high quality synthetic resins are able to impart to the finished products. The performance expected from a resin to be suitable as a binder in wood waste are:

(1) First of all, the resin must be economical in use and effective even in small quantities. Although the resin cost is relatively low, it is still the highest or even the only cost factor as far as the raw materials are concerned. The actual amount of resin used as a binder varies from as low as 3% to as high as 20%, figured on a dry wood basis.

(2) The resin must be easy to apply without expensive machines or elaborate procedure, and fit into continuous operation.

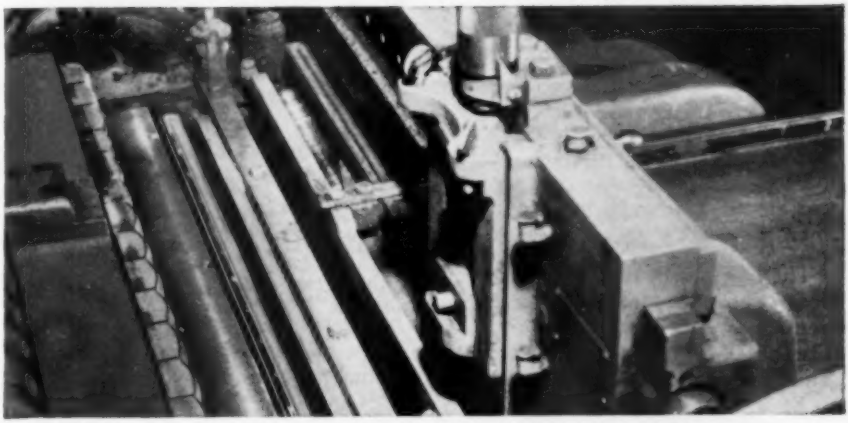
(3) The resin must not be harmful either to the machines or operators: non-toxic non-obnoxious. It must not effect or destroy the wood fibers, either at the time of use or later in service.

(4) The resin must bind rapidly, allowing top speed and economical production and fit into the requirements of mass production.

(5) The resin must impart good

Baker Furniture Co. tests with Carboloy carbides show...

Carboloy® planer knives outlast steel 25 to 1



Baker Furniture Co. planer uses four 26" Carboloy carbide knives. Operates at 3600 rpm, with feed of 80 fpm, and 1/16" depth of cut. Knives can be reground in the machine.

IN COMPARISON TESTS on a variety of furniture woods, Carboloy cemented carbide planer knives operated more than 500 hours before regrinding. Steel knives had to be reground 25 times, and set out twice.

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mechanical properties to the finished products so that they can compete with wood or other construction materials.

(6) The resin-bonded wood waste must have an excellent stability in actual use—in other words, good aging properties.

An ideal resin should, in the estimation of the users, have all these properties and, in addition, cost nothing. Needless to say, such an ideal resin does not exisit. However, the resin manufacturers are getting pretty close to meeting the essential requirements and are working diligently on further improvements.

The best finished product will result from selection of the proper resin and from proper utilization of this resin. The amount of resin used is small. Therefore, every bit of the resin has to be utilized and every resin particle has to be where it is supposed to be to do its job.

The resins used in the wood waste field at the present time are of a thermosetting nature. This means they are capable of setting or curing under the influence of heat. This process of curing is irreversible—a cured resin completes its reaction cycle and cannot be resoftened or remelted. It cannot be redissolved in either water or common organic solvents. This property makes these resins distinctly different from the other group of resins—the thermoplastics. The cured resin also has a high degree of resistance to even strong acids or alkalies.

For simplification purposes, it was agreed that the thermosetting resins exist in three stages—stage A, stage B and stage C. Stage A represents the resin as supplied by the resin manufacturer to the consumer. In this stage, the resin represents a reaction or, properly called, condensation product of such materials as phenol, urea or melamine with formaldehyde. There are many other resin constituents like resorcinol, aniline, furfural or ketones. At the present time, the wood waste field is using resin based on phenol, urea and formaldehyde with melamine entering into the picture.

The resins in stage A have a tendency to complete their life cycle to reach the final C stage. Therefore, they are unstable in storage and require careful storage control, especially with regard to the storage temperature.

Thermosetting resins usually exist in two forms, as a one-step or two-step type. The one-step resin is capable of setting or curing by itself, depending only on temperature and other conditions. The two-step resin requires the addition of a catalyst to cure. In some cases, this catalyst is practically inactive at room temperature. At higher temperatures, however, it will decompose and cure the resin. It is obvious that such a two-step resin will have a much better storage life at room temperature and be more stable in stage A.

During the curing period, the resin goes into stage B for a very short time. In this stage, the resin loses most of its solubility and fusibility. Under the influence of solvent, the resin swells without dissolving and softens without melting. Actually, it is almost impossible to isolate stage B in pure form. Stage B is actually a mixture of stages A, B and C.

The resin in the finished board or in the molded products is in stage C—in the cured stage—and exhibits properties

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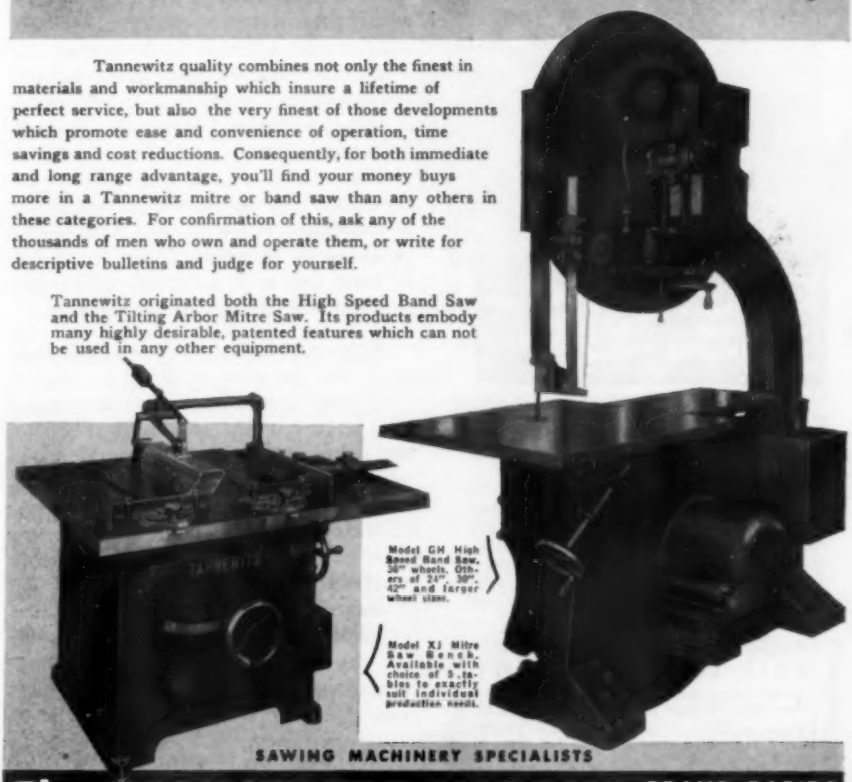

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characteristic of this stage. The curing of the board consists of completing the condensation of the resin from stage A to stage C.

As indicated previously, two types of resin are predominantly used in the wood waste applications: urea-formaldehyde and phenol-formaldehyde resin. The urea-formaldehyde resin exists in two commercial forms—liquid and powdered. The liquid resin, also called urea-formaldehyde syrup, is supplied in water solution, or rather colloidal suspension, containing about 60-70% solids. This resin is of the one-step type which means that it can cure by itself without the addition of a catalyst. As a one-step resin, it also has a limited storage life. Chemically, it represents a very complicated structure, varying with formulation and the way it is manufactured. This liquid resin is predominantly used in the manufacture of chipboard in conjunction with coarse particles. A powdered resin could not be used due to a difference in particle size and the danger of segregation.

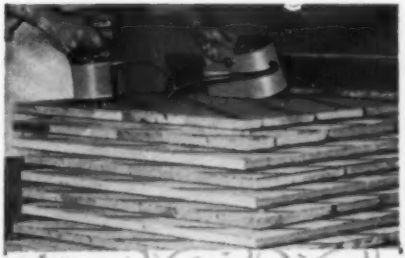
Although liquid urea-formaldehyde resin can be used without a catalyst, it is customary to use a catalyst to speed up the cure of the resin and to control the behavior of the resin in the wood waste mix prior to curing. Liquid urea-formaldehyde resin supplied for the manufacture of chipboard is of the same type as used in the plywood and furniture industries. However, it is very important to somewhat vary the characteristics of the resin to make it adaptable for the entirely different job which it has to perform in chipboard manufacture.

The practical amount of resin used in chipboard is very small. It varies from 5-10%. The reason is partly eco-

nomical and partly dictated by the requirements of density and machinability which both suffer from an increased amount of resin. We can therefore see how important it is that the resin be used completely without any unnecessary loss of effectiveness. Such losses can be caused by two things: penetration or absorption and precure.

Penetration should be avoided as much as possible. The resin should not embrittle the fibers; it should merely bind the wood surface. The more thoroughly this is accomplished, the better the board will be with respect to strength, appearance and water resistance. This can be achieved only by the proper processing and formulation of the resin by the manufacturer and/or by formulation of the proper catalyst which will be able to control the performance of the resin. Further control of this performance can be accomplished by the chipboard manufacturer, who modifies the resin by extending it with small amounts of wheat flour or starch. These extenders reduce the penetration by increasing the viscosity of the resin and by utilizing the tendency of starch or flour to hold the water. Starch or flour also has another beneficial task. It somewhat plasticizes the resin, hence reducing the inherent brittleness of urea resins and possible embrittlement of the fibers.

However, much more resin is being lost in chipboard manufacturing by precure. During the mixing operation of the resin and chips, some heat is developed through friction and this condition is aggravated by the fact that the wood is often still warm from the drying. The precatalyzed urea-formaldehyde resin has an opportunity to advance excessively during the mixing and before pressure is applied. Such



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an advanced or precured resin loses its bonding properties and acts more or less as a filler. The resin content in the board is therefore lowered and the resulting board is inferior. In such cases an especially formulated catalyst can control the resin sufficiently to delay or eliminate the precure and to cure the resin where it should be cured—in the press instead of the mixer.

The chipboard industry still requires skillful control and a "tailormade" resin-catalyst system because the process itself is still in the stage of continuous improvement. The use of a "tailormade" binder is necessary to meet the rigid specifications of the trade and not to disappoint the ultimate user.

Phenolic resins are used mostly in the wood waste field in the manufacture of molded articles, such as toilet seats. The resins used in this application are in powder form since they are used with fine wood flour and have to give a uniform mix. Under such conditions, a liquid resin would give a "balling up" effect due to the wetting action of the liquid and the surface characteristics of the wood flour.

The powdered phenolic resin used is mostly of the two-step type. It contains a mixed-in catalyst—almost exclusively hexamine. Such a resin will not cure at room temperature and the resin consequently will have excellent storage. However, at temperatures about 200°F. and close to the curing temperature, the hexamine will decompose and furnish the formaldehyde necessary to cure this type of resin. The amount of resin used in molded articles is in the range of 10-20% on the dry wood flour basis.

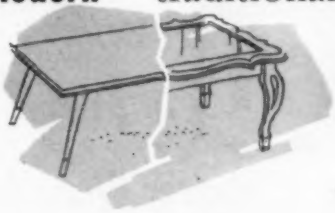
The resin must be uniformly ground and free-flowing, so as to disperse uni-

formly throughout the filler. It must have sufficient flow to coat the surrounding particles of the wood, yet without impregnation. It must cure as soon as the flow is achieved. The balance between flow and cure is of the utmost importance! A resin which will cure before the flow is completed will yield an inferior product. The reason for this is that the resin will cure fast at the contact point with the heated mold, forming an insulating layer representing poor heat transfer. The inside therefore will not receive enough heat to cure the resin and the article will be weak. Blow-outs may also occur since the thin layer cannot withstand the steam pressure from the trapped moisture. This symptom is called "case hardening." The resin also must have good water resistance.

Besides hexamine, the powdered phenolic resins contain a lubricant. The purpose of the lubricant is to sweat to the surface during the molding operation and to prevent sticking. This thin film of lubricant also forms a water repellent surface and improves the water resistance. However, the amount of lubricant has to be carefully controlled so as not to interfere with the future finishing.

It is also possible to use a powdered urea resin for this application. Such a powdered urea resin is obtained by dehydrating a urea-formaldehyde syrup in a spray drier. Powdered urea-formaldehyde resin cures without the help of a catalyst. It does not have the flow properties of phenolic resin and it utilizes the moisture of the wood flour to attach itself to the fibers. Urea resin does not have the waterproofness of phenolic resin, and articles molded with the help of such a resin require waterproofing protection.

modern -- traditional



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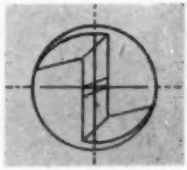

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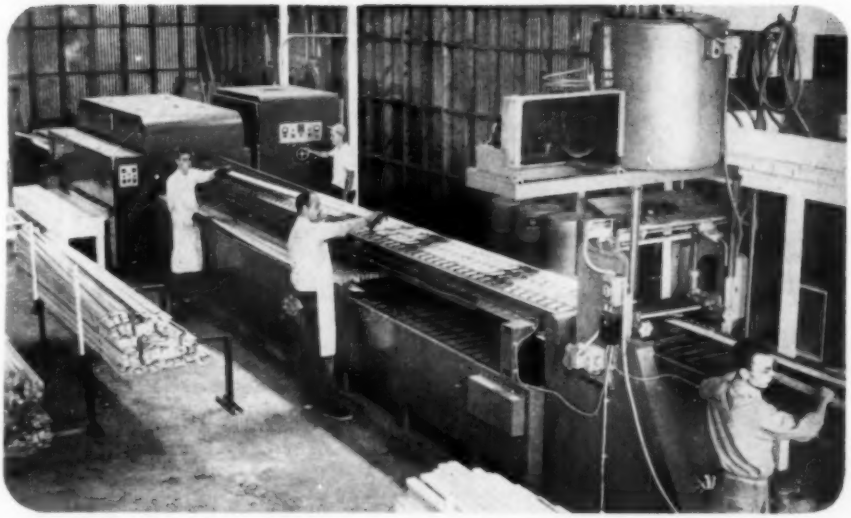
The results are encouraging although not yet completely satisfactory. Eventually, however, it is expected that all existing "bugs" will be eliminated and the results of various refinements will create an ideal synthetic board or product which will fit very well into our present age.



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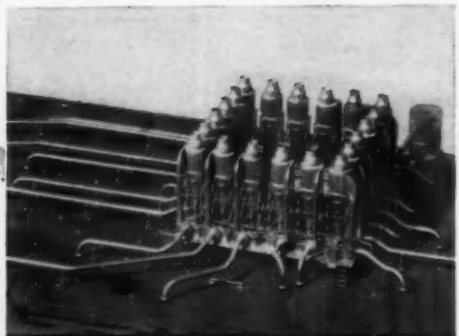

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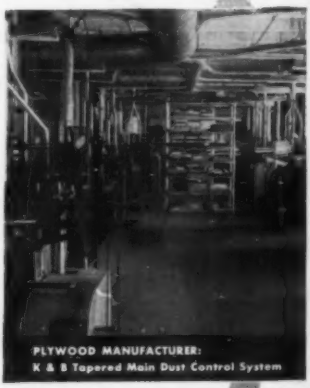

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Fundamentals of WOOD MACHINING

By Carl Chekouras

TENONING or end matching is a term often used to denote the end machining of wood. In most cases the end machining of wood parts is a hidden factor but is very necessary in assembly and collective strength of the items being manufactured. Every item being manufactured must, in some way, have the ends of the stock finished whether it be sawing or an end joint of some type.

End Matching

As important to good flooring, as the tongue and groove, is machining the ends of the flooring so that they too match to better strength and appearance. It is obvious that if the ends of the flooring were not square, unsightly open joints would appear and make what would be a beautiful job, undesirable.

Other materials that have been dressed and matched, such as drop siding or roof boards are also more valuable if they are end matched. Siding that has been end matched presents a large advantage in rough housing structure as the joints of the two board ends need not meet at a stud or rafter. In this case the end match is also essential in increasing strength of the material. Whether siding is end matched or just end machined by cutting off, it is still very important that the ends be square so that no unsightly openings will appear.

The machine used for end matching this structural material is known properly as an end matcher. End matchers are usually furnished in pairs, one of the machines to accomplish the cutting of the tongue and the other one to cut the groove.

A modern end matcher is so constructed that the stock is placed on a chain type bed and as it enters the machine it is firmly grasped and squared so that the trim saw will first cut the material square. As the stock advances further in the grooving machine, a cutter which is mounted on a vertical spindle grooves the stock passing it. The other machine used to cut the tongue is a similar machine, but after the trim saw there are two horizontal arbors each carrying tenoning or matching saws, cutting a tenon to be used as the tongue end of the match. Both the tongue and groove end matchers are sturdily built machines that are capable of not alone cutting the tongue and groove in short pieces but in stock lengths up to and over sixteen feet.

End Jointing

The primary use of both the double

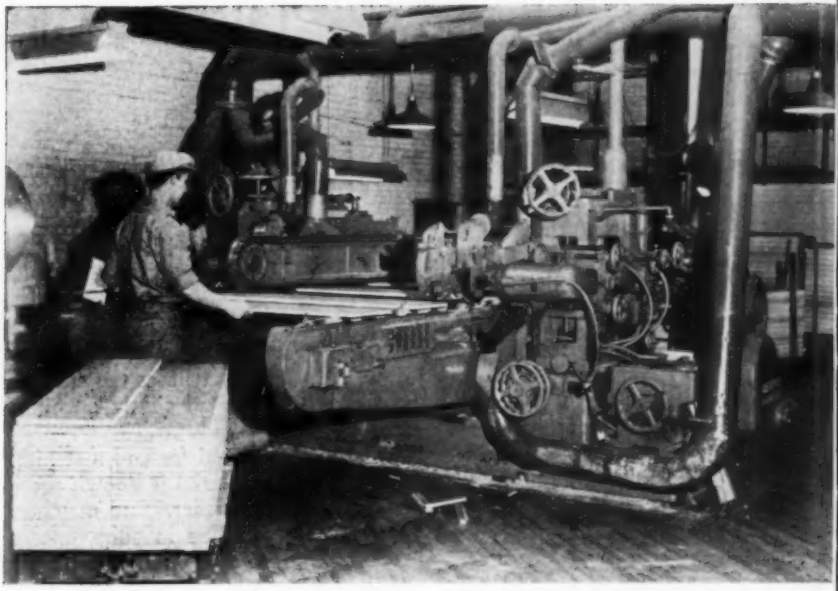

Figure 1. A double end tenoner "end machining" piano tops.

end and single end tenoners is, as the name implies, to cut tenons on the ends of stock. Tenoners are capable of many types of end joints and although they are still referred to as tenoners they are basically end jointing machines. Tenoners are used for such cuts as a drawer joint, dado joint, finger joint, scarf joint, spline joint and many other cuts that are primarily made by cutting across the end grain of the stock. It is best here to show some of the various types of joints which can be made on tenoners.

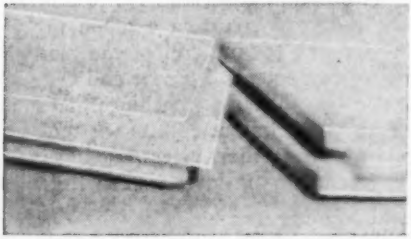

Figure 2. End matching fir flooring.

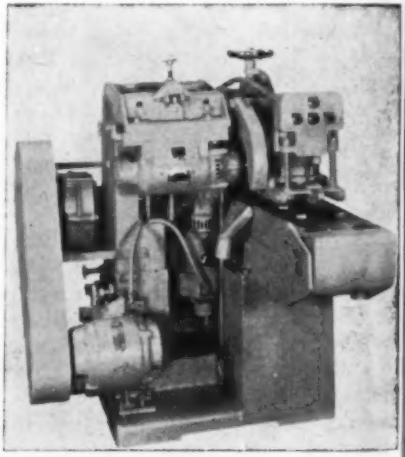

Figure 3. The grooving machine of a "pair" of end matchers.

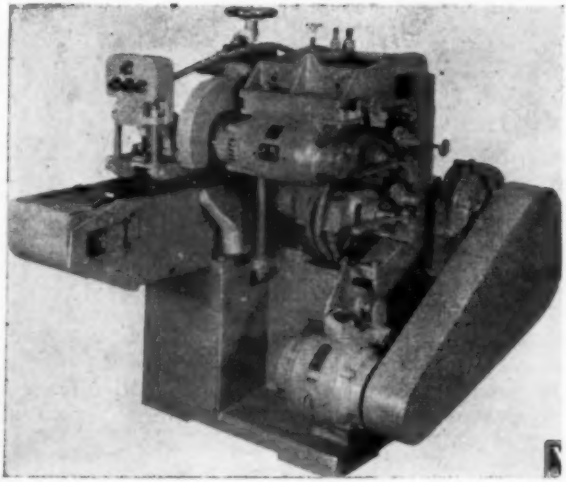

Figure 4. A different machine cuts tongue of end match.

Of the many interesting end joints the recent popularity of the finger joint has caused considerable research and study among woodworkers. A vital means of conserving material, the finger joint has many other values such as increasing the strength of stock and correcting direction of grain. In the manufacture of exterior trim such as crown molding or quarter round, the best of material must be used if longer lengths are to be produced. Properly cut and glued, finger jointed moldings are successful and are a great improvement over the use of short pieces of molding. Automatic machines have been designed and built for the manufacture of finger jointed stock and have

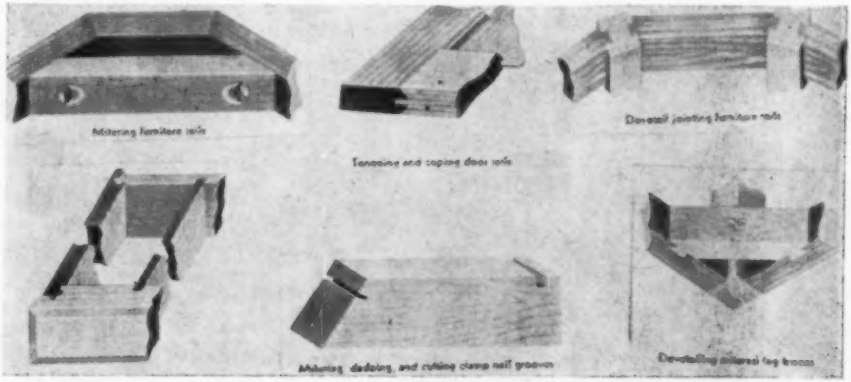

Figure 5. Joints produced on tenoners. Top row: mitering furniture rails; tenoning and coping door rails; dovetail jointing furniture rails. Bottom row: cutting square lock joints; mitering, dadoing and cutting clamp nail grooves; dovetailing mitered leg braces.

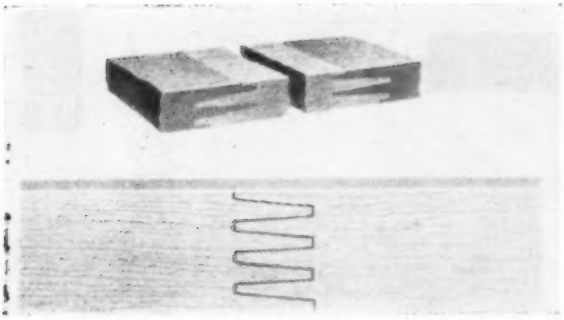

Figure 6. Two types of finger joints.

proved to be very successful.

Automatic finger joint assembly machines have been developed capable of gluing up many joints per minute and producing stock up to 20′ long. First a finger joint machine cuts stock from material of like thickness, but random lengths. The stock is then conveyed to the finger joint gluing machine where it is automatically glued and pressed together. It then moves forward to a position where the glue is electronically dried. The stock is then advanced to a point where the set length is controlled and as the end of the stock touches the trigger, a cutoff saw—radial arm type—rapidly cuts. After this it is transferred to the molding department where it is machined into the required moldings.

Lock Corner Joints

There are many versions of lock joints such as used in the manufacture of case goods, but primarily they are of the same description as those illustrated. Such lock joints are successfully cut in stock up to 20″ wide or more

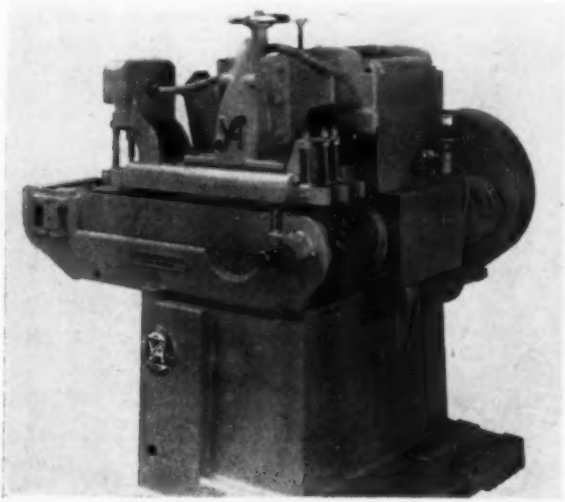

Figure 7. A modern "finger jointing" machine.

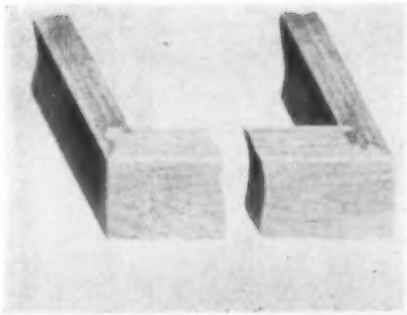

Figure 8. Mitre lock joint as cut by double end tenoner.

Figure 9. A flat wedge of steel is driven into the slot in the mitre joints.

and create a successful and more acceptable corner joint for case goods.

Composite End Joints

In the manufacture of garage doors many manufacturers, after coping the styles and muntin bars, use the principle of coping and dowels to create a strong end joint. The advantage of such a joint in the manufacture of overhead doors is in the strength given the horizontal rails. If deep tenons were cut in doors 15′ or 16′, the wood might be considerably weakened. When the door is rolled, there would be a tendency to sag.

A loose tenon joint is another type of composite end joint. It is made by routing a slot into each member to be assembled and inserting a flat piece of wood to act as a tenon in both members. Of the various composite end joints, there has been a strong inclination toward a flat wedge-like nail that

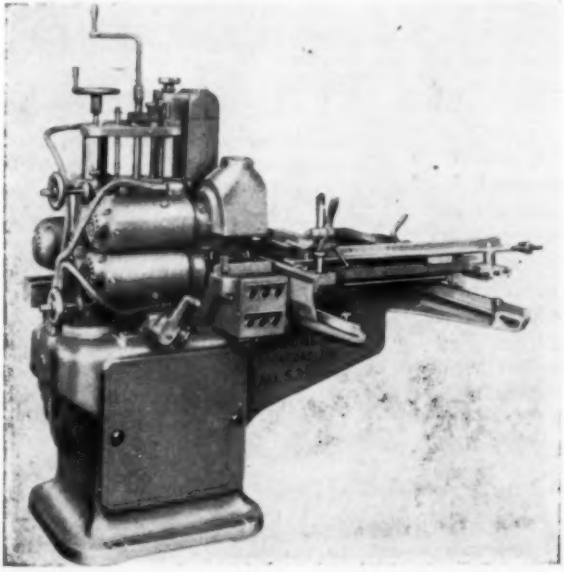

Figure 10. An electric single end tenoner.

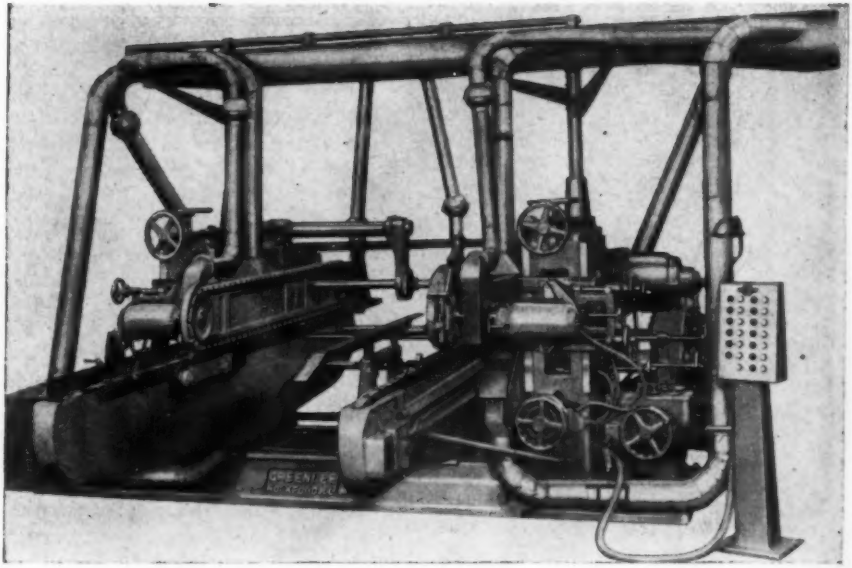

Figure 11. Infeed end of an up-to-date double end tenoner.

is used to secure a miter joint together.

Other types of composite joints have been created by the use of strips of metal as well as wood substitutes to compose what could be referred to as a lock corner joint.

Tenoning

A tenon is merely another word for a tongue. Although simple as it sounds, the tenoner is one of the more complicated single use machines in the woodworking tool industry. The machine must be so built that the stock is held square, good joints cut, accurate tolerances held and positive measurements maintained. For the cuts made by a tenoner there is no shaving off or any such method of correcting. The tenoning must be done correctly in its first operation so that the component parts of the product fit together accurately. In hobbycraft work tenoning can be accomplished using a table saw or even a small shaper. In high production it is necessary to use a tenoning machine.

There are two types of tenoners, a single end tenoner and a double end tenoner. Material to be end machined on a single end tenoner is placed on the table of the machine and brought forward to the fence. A hand operated mechanical clamp retains the stock in position and it is manually pushed forward to a position where the trim saw cuts the stock to a predetermined

Figure 12. Each end of a door rail has six different operations for coping alone.

Greenlee announces

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Here's the advanced type, roll-feed rip saw that gives you fast performance, accurate results, and material savings. The GREENLEE No. 431 handles boards up to 2⅛" thickness with a range from ¼" to 15" width, by any length, including the 12 to 16 foot length usually processed in the sash and door industry. Top and bottom rolls are canted toward the gage so the saw blade will cut to the curvature of the board and eliminate waste. Both front and rear, top-mounted power feed rolls are individually adjustable to take up to the maximum stock thickness..Totally enclosed 15 hp, 3600 rpm saw motor, mounted above the table, is supported by the heavy roll housing. Ripping with the GREENLEE No. 431 is easy, fast, safe, and economical. Write today for data.

GREENLEE BROS. & CO., 1867 TWENTIETH AVE., ROCKFORD, ILL.

Figure 13. Two sides of door frame "back-to-back" are machined simultaneously. Notice the diagonal sill dado.

length. From there the stock is advanced to a point where the top and bottom tenon heads are cutting their portion of wood away leaving the tenon.

When such parts are used in sash and door work, they generally have to be coped. The stock then would be advanced beyond the tenon heads to the position where the cope heads, mounted on vertical spindles, cut their portion of the pattern known as the coping.

It is obvious that such a machine, although complete in itself, would not be sufficient for high production. When high production is required a double

Figure 14. Two conveniently-located dials show the distance between cutter heads, permitting rapid adjustments to within a fraction of one sixty-fourth of an inch.

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...and that goes for mahogany, also!

Figure 15. "Shaping" a table top on double end tenoner.

end tenoner is employed. A double end tenoner machines both ends of the stock at the same time; it is mechanically fed; and the stock needs only to be placed in the machine for the machine to make the many different cuts.

On the double end tenoner the stock is placed on the rails and from there it is advanced or picked up by the lower chain. This chain has lugs, known as dogs, arranged so that when the two ends of the stock are against the dogs the material is squared for accurate and perpendicular machining of the ends. The stock is then advanced until it passes the trim saws which cut it to the predetermined length. In some machines the stock is advanced to a position where scoring saws cut the shoulders of the tenon. The stock then moves to the position between the top and bottom tenon heads which cut out the tenon. From there the stock advances to a position where the cope heads cut the pattern.

Some double end tenoners can also be equipped with another arbor for cutting dados such as in shelf ends. These dado cutters are fixed on another arbor that crosses the machine for the full length of the machine and are known as "jump" dado arbors. The name "jump" dado is used because these dado cutters can be controlled in their action by a cam attachment that will raise them or lower them as required. Because of the precision and skill necessary in the manufacture of a double end tenoner, it is a highly specialized machine manufactured by only a few companies. In the high production of sash and door parts there is no substitute for a good double end tenoner.

Modern double end tenoners have been equipped with a built in measuring device that operates automatically to cut the stock to a desired length. The head end of the machine is usually permanently mounted on the base. The left side of the machine is adjustable to the length of stock being machined. Modern machines are so equipped that after releasing the screws

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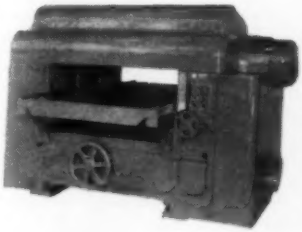
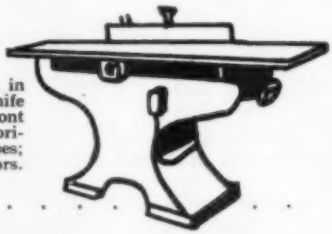


"CRESCENT" PLANERS (Single Surfacers)
Extremely accurate single surfacers for continuous, high-efficiency production; 18 in., 24 in., 30 in. and 36 in. sizes. Precision-machined four-knife cutterheads; four gear driven feed rolls (18 in. model, 2 rolls); push-button control of table elevation in larger sizes; torsionally-rigid one-piece frame design; feeding speeds 15 to 80 fpm; 3 to 15 hp motors. *Write for Bulletins 204 and 210.*

"CRESCENT" JOINTERS
Very rigid, versatile jointers in standard 12 in. and 16 in. sizes; 4-knife round cutterhead, 4½ in. cutting circle; each corner of front and rear tables independently adjustable; independent horizontal and vertical adjustments; fence tilts to 45-degrees; automatic guard removable for rabbeting; 3 to 7½ hp motors. *Write for Bulletin 206.*



"CRESCENT" BAND SAWS
Standard 36 in. wood and metal-cutting band saws for ripping, cutting off, contour sawing, etc.; massive construction, handwheel tilting table; balanced wheels; counter balanced guide bar; ball bearing saw guides; 23¾ in. clearance under guides; 3 or 5 hp motors. Also models for cutting plastic, burlap, paper, rubber. *Write for Bulletin 205.*

"CRESCENT" TENONERS
Compact, powerful, single-end, all motorized models; 29 in. x 36 in. table; will tenon up to 20 in. wide, 3 in. thick; 1 and 2 hp motors with individual and master controls.

"CRESCENT" SHAPERS
Single and double spindle models, soundly engineered, with one-piece semi-steel cast frames, ball bearing mounted spindles. Model S-2 for light or occasional work; Models S-5 and S-55 for production operation.

"CRESCENT" TILTING ARBOR SAWS
Heavy-duty floor-mounted, with 40 in. x 45 in. table, 1⅛ in. arbor; saw sizes to 20 in.; cast aluminum saw guard; tilting fence; cuts 4 in. thickness with 16 in. saw; rips 24 in. with fence to right, 19 in. left; cutoff capacity 1 in. x 18 in.; 3 in.-wide dado; saw arbor tilts to 45-degrees; 5 hp motor.

"CRESCENT" DISK SANDERS
Double or single disk models in 18 in. and 24 in. sizes for heavy production; table adjusts 45-degrees up or down; 1½ or 3 hp motors; disk speed 1750 RPM.

"CRESCENT" MORTISER
Heavy, well-balanced hollow chisel model for vertical mortising up to ¾ in.-square chisel bit. Table tilts to 45-degrees, with vertical adjustment of 10 in., cross adjustment of 4 in.; foot treadle controls vertical spindle movement, adjustable to depth of mortise up to 3½ in.; 2 hp motor.

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that hold the machine to a definite position, a lever will activate the electrically operated mechanism that opens the machine to a desired width as read on a large dial scale. These advantages are quite necessary for high production. After the machine is properly setup and the cuts are tried, the stock can be started through the machine. After the necessary number of rails are run for a 2'-8" door, the machine can quickly be opened up to manufacture similar rails for a 3' door without going through an inconvenient and time-consuming setup for another length.

Both in the case of a double end or single end tenoner the material to be machined is worked face down so that when the component parts are assembled, the matching patterns will be accurate and the back side need only be sanded to produce accurate, strong sash, doors, or furniture.

Both the single and double end tenoners are employed in the end machining of table tops, drawer fronts, furniture panels, etc. In many instances the pattern is machined by the tenoner to be exactly the same as a pattern that may have been shaped on the front of, for instance, a dresser top. A shaping attachment can be used to cut irregular edges. This attachment is automatic and controlled by a cam.

In such cuts the double end tenoner employs only the trim saws and shaper attachment to accomplish such work. In some instances the tenoner can also be used as a double cutoff saw to cut stock to a definite given length. Tenoners are also used successfully to manufacture finger joint stock. However, all pieces to be finger jointed must be the same length. Production can be increased by using a double end tenoner for finger jointing.

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FURNITURE MAKERS
Show Wares At Chicago Market

DURING some of Chicago's hot, humid days, the American Furniture Mart Summer Market got underway. Scheduled to run through June 28, WOOD WORKING DIGEST is publishing news of the first days. A complete report and pictures of new styles will appear in our August number.

Irish Provincial

Among a number of significant events, Irish Provincial made its appearance at this Market. What is Irish Provincial? French, American, Italian and Spanish provincial have all been on the scene. Now Irish Provincial appears in dining room suites at Bernhardt Furniture Company.

About 1711, coinciding with the period of Holland's decline while the population and prosperity of Ireland increased, artisans connected with various phases of furniture making in Holland, the Baltic, other North Sea areas, and the neighboring continent, emigrated to Ireland to continue their crafts, settling in Dublin, Galway, and other Irish cities. Among these was Abraham Roentgen, who found use for his highly trained skills in Galway, a town with only a fraction of the population of Dublin, but one which established a reputation in furniture crafts before the middle of the 18th century.

Bernhardt's Irish Provincial group is called the "Galway Group" and is contemporized from outstanding examples of Roentgen's more refined work during his Galway period—examples which are now in collections owned by the Belfast Museum and the National Museum of Ireland at Dublin.

The five outstanding features of the "Galway Group" are: (1) front shaping and over-all unusual proportions, (2) cross-banding of the direction of graining, (3) unusual hardware, (4) open-pore walnut finish, and (5) carved feet on the tables.

Beautyguard

Beautyguard genuine hardwood tops appeared in lines offered by several manufacturers. Furniture with a Beautyguard top is resistant to cigarette burns and beverage stains. The process has been developed by the Fine Hardwoods Association for the benefit of the entire industry. See page 126 of this issue for a complete story on how one table manufacturer is using the Beautyguard process.

New lines in this contemporary bedroom group are enhanced by inlaid maple stripes in walnut. This "Cosmopolitan" group by Basic-Witz is distinguished by the absence of any hardware except for an accent of silver trim on the bases.

Grand Rapids Group

Another "new" at this Market includes a group of manufacturers from Grand Rapids now showing lines in new spaces on the third floor. Six important Grand Rapids firms have taken leases to expand their sales programs. The original group coming to the Chicago Market are: Sligh-Lowry Furniture Co., Inc., Holland, Mich.; Imperial Furniture Co., Inc.; Schoonbeck Co., Inc.; Grand Rapids Chair Co., Inc.; Furniture Upholstering Co., Inc. and the Hexton Furniture Co., Inc. The last five are all from Grand Rapids, Michigan.

Market Survey

A recent survey and study of Markets—of which there are now 20 in the United States clearly shows:

● That the January and February Markets have been universally good, both as to attendance by buyers, and in the volume of goods sold at the Market. The January and February Markets are the best of the four markets.

● The Spring Markets, usually held in April and May have developed into exactly what they were planned to be —a Preview Market—where the manufacturer and the merchant—especially the large buyers of merchandise for Summer and Fall sales could meet and talk over the requirements of the merchandise as to style, design, price and delivery dates so the wholesalers, retail merchants, and distributors can properly plan their program for the second half of the year, and for the numerous interim special sales, it now being the sales policy of many large retail establishments to have special home furnishings sales of appropriate and seasonal items, each month.

The study and survey just made clearly shows that with the advent of these new sales programs, special sales,

Table surface of this attractive group is protected by the new Beautyguard process from cigarette burns, beverage rings and other abuses. Furniture is by Lexington Chair Co., Lexington, N.C.

discount sales etc. etc. the traditional problem for retail sales in the home furnishings industry still holds; 40% of the retail sales are made in the first half of the year and 60% in the second half.

The Summer (June) Market is becoming of increasing importance for the retail merchants have planned it so they will be open to buy at the Summer Market. Their inventory position each year for the past six years has been sound and the orders placed at the June Markets have been increasingly larger.

NEXT MONTH
Styles and Finishes

HEART SHAPES IN HINGES

Five new hinges in heart design have been added to the forged iron cabinet hardware line produced by McKinney Manufacturing Company, 1715 Liverpool Street, Pittsburgh 33, Pa.

These new cabinet hinges are identical in texture and finish to the balance of McKinney forged iron builders hardware. They are made of the same rough metal, have beveled edges, and are furnished with slotted square head stud screws.

Three finishes are available: dull black, old copper, and relieved iron. The dull black and relieved iron finishes are offered by McKinney as rust resisting.

Both H and H & L hinges are available for flush or $\frac{3}{8}$" lipped doors. A semi-concealed hinge is designed for $\frac{3}{4}$" doors with a $\frac{3}{8}$" inset. All are tight pin, not handed, and are applied full surface, not mortised.

PREPACKAGING BOOK

Prepackaging—from the points-of-view of retailers, distributors and manufacturers—is fully explored in the new, completely revised edition of a 32-page booklet—"How to Prepak In Corrugated Boxes"—just published by Hinde & Dauch, Sandusky, Ohio.

Number nine in the company's Little Packaging Library series, the booklet contains more than 20 photographs showing how various H & D corrugated Prepak boxes have been adapted to a wide variety of products.

Subject matter describes how the Prepak eliminates unpacking and repackaging of merchandise, how it reduces delivery costs, stimulates multiple-item sales, sells related items, cuts product damage, facilitates storage and inventory, eliminates product assembly operations, insures factory-fresh merchandise, increases the value of the product, and promotes customer goodwill.

A copy of the new edition is available on request to Hinde & Dauch, Sandusky, Ohio.

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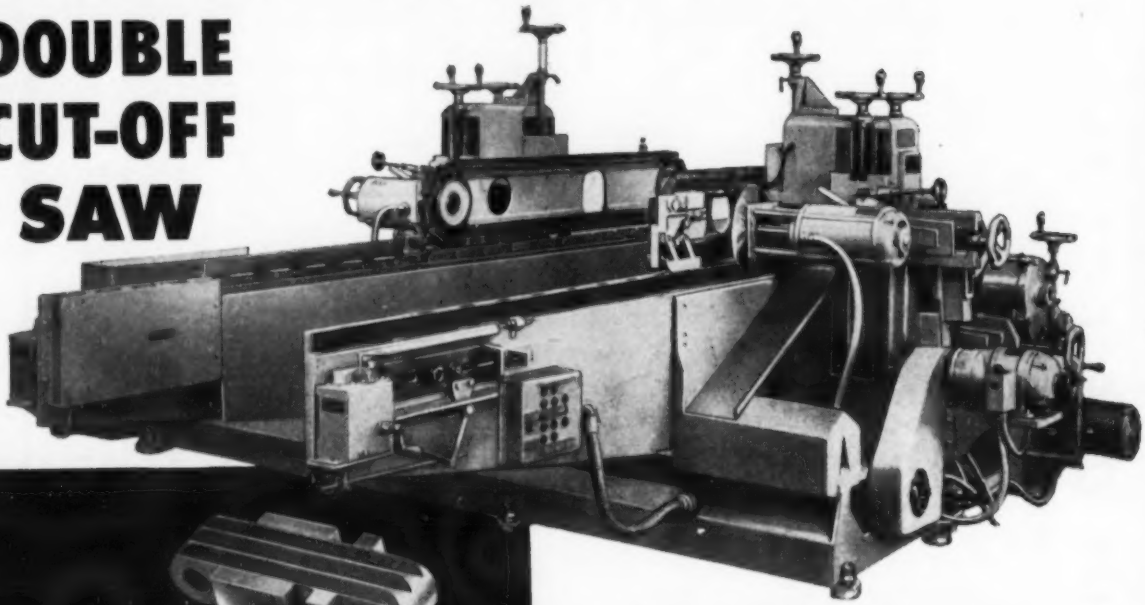

The No. 300 is offered to meet varying working conditions. It can jump dado arbor or other accessories

with the MULTI-V CHAIN

This special chain is furnished on the M-J No. 300. Note the 45° angle of the three V grooves to prevent sideways movement. The inverted center link clearly illustrates the full length bearing surface in both horizontal and vertical planes. There is approximately 55% greater horizontal and 95% more vertical bearing area than with low angle single V-chain. Patented snap dogs are standard equipment.

The No. 300 is offered to meet varying working conditions. It can jump dado arbor or other accessories as required. The sturdy, welded steel construction . . . rubber block hold-downs . . . snap-on feed dogs . . . and variable feed drive are only a few of its outstanding features.

Write for the No. 300 Bulletin

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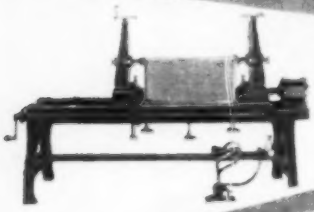

NO. 215 Air Operated Drawer Clamping Machine. For drawers with male dovetails on both ends of drawer sides.

NO. 230-B
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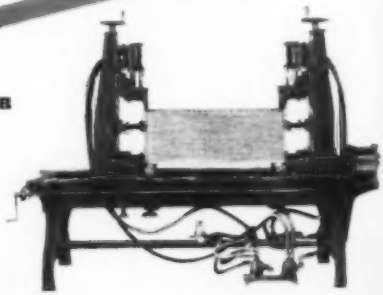

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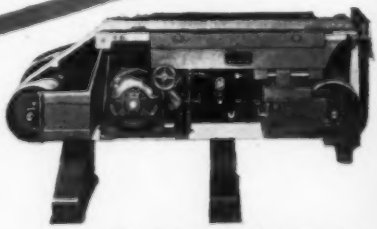
Motor Driven Dovetail Glue Spreading Machine. Clean! Fast! Glues pair of sides in one operation.



NO. 600-C
Motor Driven, Ball Bearing, Drawer Sanding Machine. Dependable! Can adjust angle of belt travel; thus, saving wear on belt when extreme angle is not needed.

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RIGHT OR WRONG

A roundup of day to day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to WOOD WORKING DIGEST.

Can a worker be discharged if marital difficulties interfere with his job?

What Happened:

Mac Allen and his wife were having a rough time in making a go of their marriage. They bickered, they fought, they argued. Their incompatibility even spilled over into Mac's workaday life. She would phone him during his shift and begin where she had left off after breakfast. Other employees were sorry for Mac, and his marital plight became common knowledge. There was a lot of sympathy for Mac even among management. Mr. Gracey, the plant superintendent, tried his hand at a reconciliation. It didn't work. Finally the Allens got a divorce.

The custody of the child was awarded to the wife, and Mac had the responsibility of mailing monthly payments for the youngster's support. One month he failed to make payment, and someone came to the plant and served him with a summons. Another time, Mac went to visit the child, and when his wife slammed the door in his face, he broke it down. She filed a criminal charge against him, and arresting officers came to the plant to take Mac to court. He was fined $19.50 for malicious destruction—and when he failed to pay the fine, the cops came to the plant again and took him into custody.

Fed up with the whole thing, the

company fired Allen. At the arbitration, the company's position was that Allen's domestic trials were becoming a matter of public or semi-public knowledge. Employees all chattered about his problems, and this made for a disturbing atmosphere. Furthermore, Allen's family difficulties caused him to neglect his duties—even though he didn't have a job that could be measured in direct output.

Allen's main argument was that his private life was his own, and that his personal problems did not interfere with his work to the extent of warranting discharge.

Was the company: Right ☐ Wrong☐

What Arbitrator A. T. Singletary Ruled

"The arbitrator finds that Mr. Allen's marital difficulties had reached such proportions that they did in fact interfere with the normal discharge of his duties as an employee of the company. The arbitrator finds that although Mr. Allen was not directly responsible for some of these difficulties being called to the attention of plant personnel—nevertheless the fact that his problems did become common knowledge created an unwarranted disturbing influence at the plant. The arbitrator refers particularly to Mrs. Allen's frequent calls, and the occasions on which officers of the law came out to the plant on account of his domestic personal difficulties. The arbitrator finds therefore that the discharge was justified."

Can an employee be forced to resign?

What Happened:

The foreman came over to May Kane one morning, and after making sure there was no one else listening, he

whispered to her: "I have bad news for you."

"What kind of news?" she quickly asked.

"Come with me and I'll tell you," he said, and started to lead the way. After they reached the office, the foreman told May that he had received an anonymous letter accusing May of going out with a married man in the company. May became frightened.

"What should I do?" she asked.

"To keep down talk and embarrassment, I advise you to resign," the foreman answered. "In fact, I think that's just what you should do."

May packed her things, signed out, and left. A few days later May showed up and said that she changed her mind. Nothing doing, said the company. You resigned and that's that. She filed a grievance to get her job back. At the arbitration, May argued:

- I was forced to resign.
- The foreman had no business to suggest that I quit. My work was good, and my personal life is my own affair.

The company didn't go along and maintained that an important principle was involved. Once a person resigns,

a company is under no obligation to reinstate him.

Was the company Right ☐ Wrong ☐

What Arbitrator J. M. Klamon Ruled:

"A basic point is whether the termination was truly voluntary, or involuntary. If an employee advises the company he or she wishes to resign, the company has every right to accept such voluntary resignation forthwith, and no grounds for any grievance exist. This is an important management right. To hold otherwise would be to force the company to reinstate any employee who might voluntarily resign and then have a change of heart. Was the resignation in this case forced? We find and hold that it was, and we further find and hold that it was not for any established just cause. We deliberately use the word 'established' just cause, for the record fails to disclose the basis for Foreman Graham's action. May Kane was therefore induced or persuaded to leave without any just cause being shown or proven. She did not come to work intending to resign. I award reinstatement with all rights."

Can an employer discipline a worker who stood around idle after he completed the minimum called for under an incentive system?

What Happened:

Under the company's incentive plan, 60 units an hour was considered the accepted minimum standard of output. By 2 p.m., Andy Remak had put out 480 units. Quitting time was 4 p.m., but Andy went to his foreman and asked leave to go home. "I made my minimum—I got nothing else to do," he said.

"You go back and turn out more work," the foreman said. "You can use the extra money."

Andy returned to his job but didn't do any work. He was given a 2-day suspension. Andy's union took up the case because it considered that many important issues were involved here. At the arbitration, the union presented its side:

- Andy put in a "full day's work" when he produced 480 units which was the minimum requirement. Because he did such a "stupendous" job in 6 hours instead of 8, he should not be penalized.
- An "8-hour day" doesn't mean that an employee has to have his nose to the grindstone every minute.
- If Andy has found a shortcut to producing the required units, he should be free to use the extra time as he sees fit.

Management had other ideas:

- If a worker is told to work by his supervisor, as Andy was, he should obey, and not loaf.
- A "workday" means that an employee should work during that period without regard to minimum output. The employee cannot at his whim decide to work less because he had produced the minimum requirement.

Was the company: Right ☐ Wrong ☐

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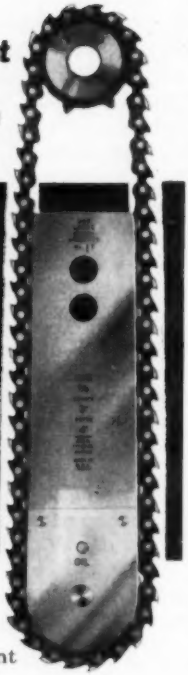

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What Arbitrator Walter M. Appleby Ruled:

"The purpose and concept of incentive production would be destroyed if an employee stopped producing after the minimum work units had been attained. The very existence of the incentive plan is indicative of the mutual desire of the parties to increase normal production and to afford the employees an opportunity to increase their earnings through incentive effort. The union's concept that an employee, working on an incentive basis, may cease productive activity after attainment of the minimum requirement is entirely foreign to the universally accepted concept and practice that an employee is expected to exceed normal production by working at an accelerated, or incentive, pace throughout the hours of work specified in a given work-day or work-shift. In conclusion the arbitrator must support the position of the company that incentive workers are required to work a full day, consisting of 8 hours. The union has failed to justify its contention that an employee has the right to stop productive activity, during a work-day, on the basis of units earned."

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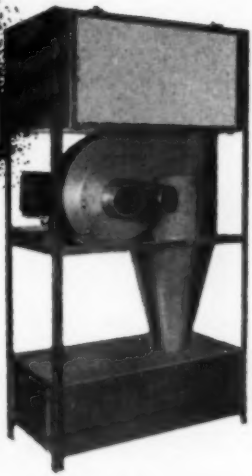

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HANNA BULLETIN

Hanna Engineering Works has announced the development of two types of universal cylinder mountings in Bulletin 76. These mountings eliminate problems due to misalignment between cylinders and their loads thereby reducing costs associated with breakage of mechanical devices and cylinders.

The universal mountings are available in two forms: a hinge mount cylinder with universal mounting brackets at

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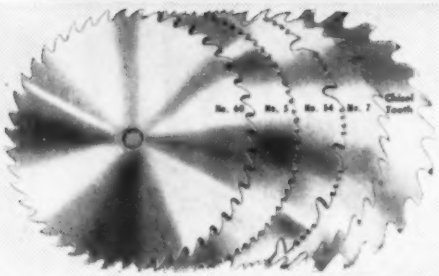

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each end, illustrated in the photo, and a cylinder with universal trunnion and universal mounting bracket for the rod end.

Common applications for cylinders with universal mountings include the operation of hopper gates, elements rotating about shafts such as gear segments and levers, and objects moving on wheels or tracks such as truck or transfer tables. They also compensate for deflection and misalignment where cylinders are connected to structures that are riveted, bolted or welded together.

Bulletin 76 illustrating the use of these mountings and giving dimensions is offered by Hanna Engineering Works, 1765 North Elston Avenue, Chicago 22, Illinois.

DIESEL ANSWER BOOK

"What is a diesel engine?"

"What are the principal differences between diesel and gasoline engines?"

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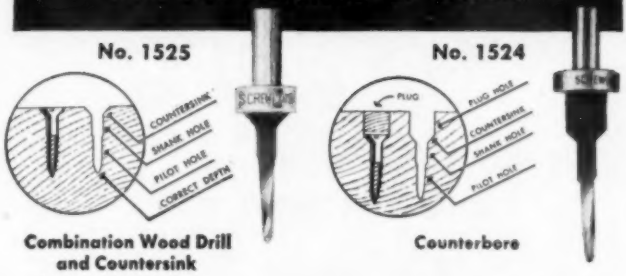

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Fully illustrated, the booklet is designed to acquaint the reader with the basic principles of diesel operation. Each question is asked and answered in simple, non-technical terms, for example:

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CARBIDE LITERATURE

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to the woodworking industry by Carboloy Department of General Electric Company, Detroit.

The two-page sheet, referred to as WW-25, supersedes the catalog page issued as WW-54.

SAW CATALOG

A new catalog showing the latest Lesto electric hand saws is just announced by Victor J. Krieg, Inc. Lesto saws are high precision products made in the best tradition of Swiss craftmanship.

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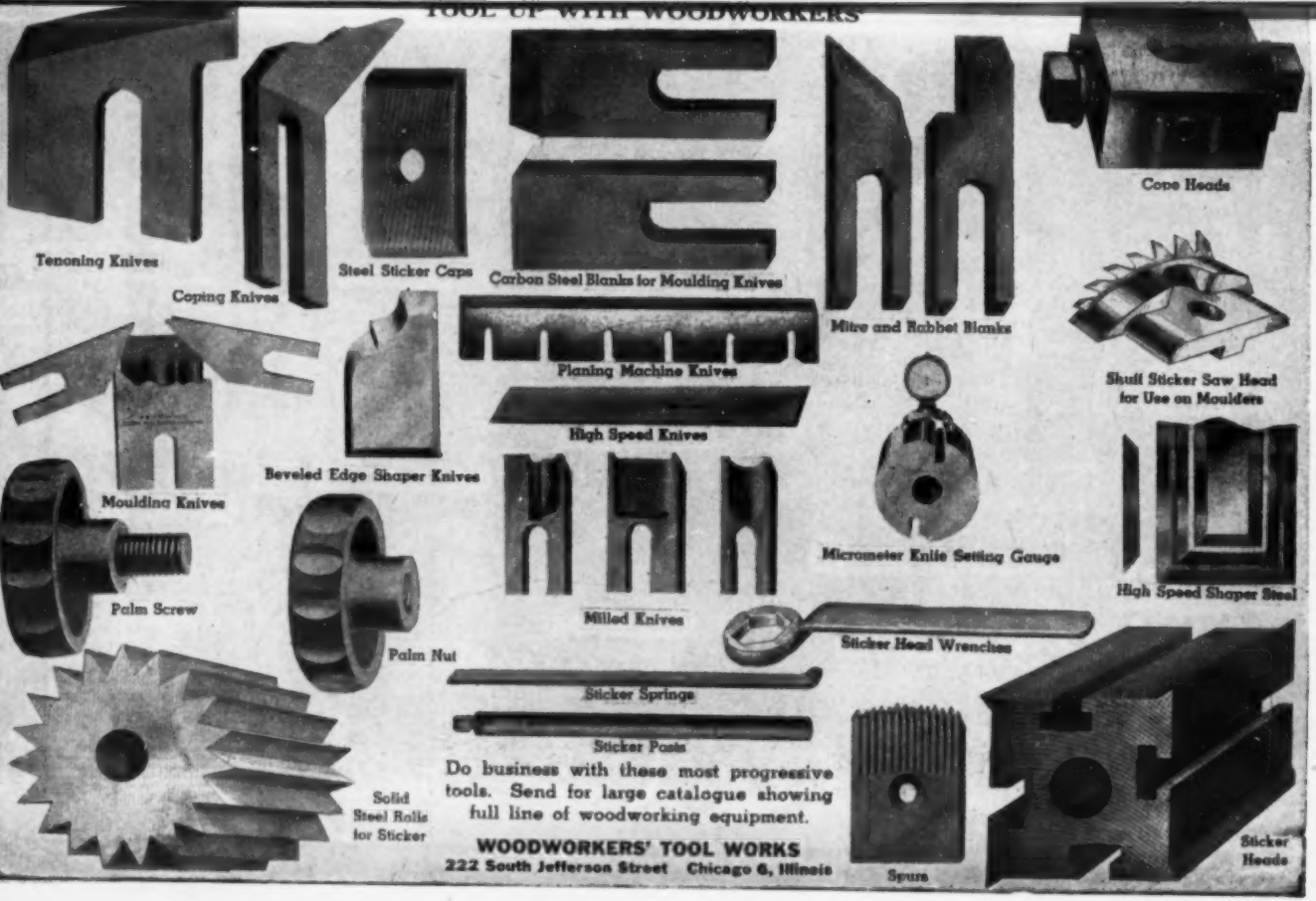

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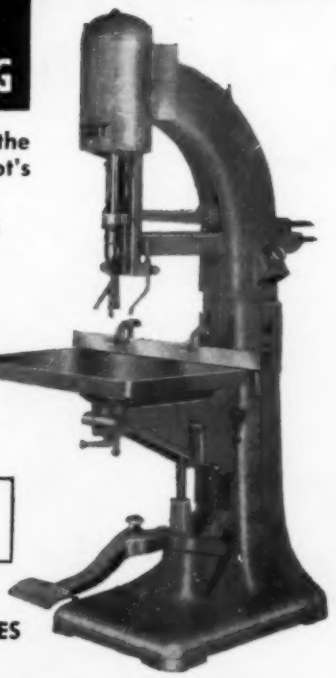

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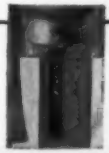

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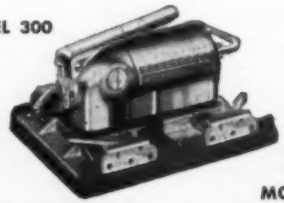

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Modern Finishes For Cherry

By
H. H. Connelly

THE modern trend of cherry finish is, to say the least, sensible. For in most cases the tendency is to bring out the natural attraction of the wood, its true texture and beauty. There is a distinct tendency to stay away from red and the antique effect is prominent. We find the modern cherry finish approaching "aged" effect. Names such as carmel, amber, parchment, pecan, and Provincial fruitwood bear this out. Further, to obtain an aged effect, stress marks are added to the wood.

Unlike walnut, mahogany or oak we are dealing with a close grained wood of fine texture. This, for all practical purposes, means our method of seasoning, machining and handling through all operations, including sanding, should be geared to the wood we are working. Because cherry is noted for its excellent property of "staying put" when once correctly seasoned and machined, we can be reasonably sure the product we turn out will be here a long time if given half a chance. This wood was often the choice of our early cabinet makers. The antique pieces that have survived are in a remarkable state of preservation.

In addition to the properties of good stability, cherry has excellent shock resisting ability, a moderate degree of stiffness and a surprisingly small shrinkage factor. This property is found advantageous in finishing solid cherry furniture where forced drying of coating materials is the general practice.

By all means check for correct drying and conditioning before machining. For cherry, it is usually best to dry to a moisture content approaching more nearly the minimum it will reach, than the maximum it will experience, because swelling is not so disastrous as shrinkage. This precaution is doubly important to the manufacturer of solid furniture. For those using cherry veneered furniture panels, the factor of shrinkage or expansion is controlled to a large measure by the type of glue used for laminating. A water resisting glue such as urea formaldehyde is good stability insurance. Your finish, if of a good quality and correctly applied, will serve as a protection as well as a beautifying agent for your cherry product whether it be veneered or solid.

How much work should be done to cherry furniture in the white to obtain a quality finish? Spend little money at this operation, accept the material as received by the finishing room, ignore the small blemishes and proceed with the next operation, staining. The

results will be either a poor product that is reflected in the sales or excessive money spent later in the finishing operations to remove defects that could have been removed while in the white at half the cost in material and labor.

If you feel glue sizing is helpful, this should be done to the wood in the white. The question is often raised, is glue sizing necessary for quality finishing? Are you following with a non-grain raising stain? If so the glue can be deleted without harmful results. Probably we find glue sizing has its greatest advantage where a water stain or alcohol stain is used. On the other hand, if soft woods such as poplar are used in combination with cherry, glue sizing will overcome any tendency to "fuzz" during the subsequent operations.

A thorough light sanding of all wood in the white with 5/0 paper should be the first step in finishing whether glue sized or not. Combine this operation with a thorough inspection. Dents should be raised. For this, keep an electric heating iron and water sponge handy. A touch of water followed by the hot iron will swell out blemishes in a few seconds. Always sand the surface smooth with fine paper. Other troublesome defects such as oil or grease spots should be removed. A soft cloth dampened with V.M.P. naphtha will do the trick and evaporate immediately.

If you are following the finishing trend of aging the cherry, the stress marks should be scratched in the wood when placing the units on the finishing line. This, to the repairman, who has worked faithfully to remove all defects, will appear nuttier than a fruit cake. However, stress marks are uniform and look more like finger nail scratches than dents from a hammer. A small piece of sharp carborundum is used for this purpose and is applied in a circular motion leaving a shallow shaped scratch approximately one-half inch in diameter and is not noticeable until stained.

Following the proper preparation of the wood for manufacturing, you will find ten basic steps that are recommended for good finishing of cherry furniture. These steps listed in the order of their application are (1) touch-up and prepare in the white, (2) stain, (3) wash coat, (4) sand, (5) pigmented wiping stain, (6) oil shading stain, (7) seal, (8) sand, (9) top coat, (10) rub and wax.

The end results obtained from the above steps will depend upon more factors than following a prescribed schedule. Two plants can go through the same identical steps: one will turn out a superb product, the other an inferior product. The difference is found in the quality of finishing material, how skillfully it is applied and the correct spacing of operations.

What type of stain is most suitable for finishing cherry? If you are alluding to color, the answer would be that which meets competition by providing the most attractive color and is in harmony with ideas of the designer. However, if you are thinking of formulation, a factor of paramount importance in choosing stain, careful consideration should be given to the type and its objectionable or commendable properties, how stable to light, dangers of bleeding through the finish, drying properties, tone and ease of application.

In choosing a stain it is enlightening to recall that for one thing modern

A thorough preparation of the cherry wood in the white saves many rejects in the finishing room. Operator is sanding with 5/0 paper after glue sizing the chest.

furniture stains are comparatively new, and research has added materially in improving the lot of the finisher. The early cabinet makers turned to chemical stains to add luster and color to their work. Permanganate of potash was used for staining by adding six ounces of powdered permanganate of potash to one gallon of hot water. It is still used in a limited field. Bichromate of potash was another. Sulphate of iron was used to produce black and gray; nitric acid, sulphuric acid and pitric acids were used where yellow was needed.

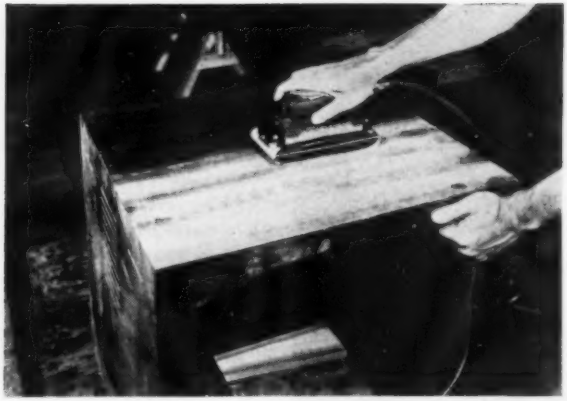
None of the above mentioned stains is recommended for the finishing of quality furniture today. This type of stain imparts color because of a chemical change partly through harmful burning of the wood. What the furniture finisher is seeking is a dye, opaque and stable to light.

Stains for the modern wood finisher are divided into four groups: (1) water aniline, (2) spirit aniline, (3) oil aniline, and (4) non-grain raising stains.

All the above stains can be secured in the dry powder form, ready mixed for color, leaving only the job of adding the carrier. Or one can order the necessary powder and mix to obtain the shade and tone. The former method is the more reliable.

The water soluble stains have a number of advantages, also they have disadvantages. They produce good tone depth and are permanent in color when exposed to sunlight. They are usually mixed in a ratio of 4 lbs. of dry powder to 16 gal. of hot water. The intensity is decreased by dilution or increased by adding a heavier concentration of powder.

In staining with water soluble powder the big objection is the unavoidable practice of adding water to well seasoned wood, the delay required for drying, and the problem of raised grain. The advantages are found in its low cost. Most finishing materials are costly because of the solvent. Water is abundant and costs little, with an additional saving in freight.



Sanding the sealer on a cherry TV cabinet is a major step in quality finishing. A good sanding sealer can be sanded 30 minutes after coating. An air operated jigger sander loaded with 6/0 paper is used.

One concern finishing solid cherry furniture using a water stain has solved the drying problem with drying ovens and glue sizing. Any grain that would be raised by the water stain is raised first by the glue size and smoothed with steel wool and sandpaper before staining.

Oil stains show favorable color penetration, probably more favorable than water, and produce surprisingly clear tone. Furniture stained with oil stain will not have the even staining that water stains display.

Since the rate of drying is controlled by the evaporation rate of the solvent, you have considerable control over a finishing schedule. High boiling solvents such as kerosene evaporate slowly; V.M.P. naphtha evaporates rapidly.

Many firms buy oil soluble aniline and mix with a thinner. Oil aniline is a synthesis of the coal tar industry and as such it is one of the principal sources of stain for furniture. The advisable practice is to first dissolve the pigments with benzine or turpentine and cut to the desired shade by diluting with a suitable thinner.

Non-grain raising stains probably approach the furniture finisher's conception of perfection more nearly than any previously developed. These stains are stable to light, displaying the enduring qualities of water stains without the unmanageable habit of raising the wood fibers. They are non-bleeding, quick drying stains that offer no obstruction to a fast schedule.

NGR stain is a striking example of the forward strides made in formulating new finishing materials during the past quarter century. Undoubtedly in time it will, for all practical purposes, replace the water stains and oil stains mentioned.

The dye, of course, is of acid aniline colors. One important solvent is ethylene glycol, a member of the alcohol family. Another solvent often used in the place of ethylene glycol is diethylene glycol, another important member in the alcohol family. After the dye has been dissolved by the glycol it is diluted with methanol, another alcohol but a fast evaporator.

The recommended procedure is to secure these stains from your finish-

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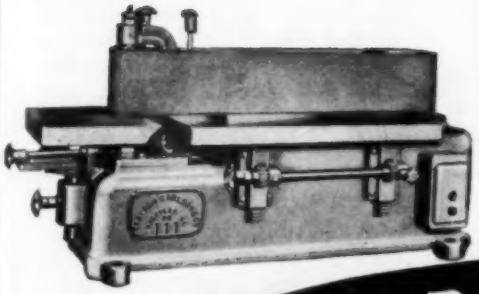

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ing material supply house ready mixed. At that, don't overstock. Both materials are hydroscopic and will dissolve in water if added. Occasionally a metal container is attacked by the chemical, resulting in a color change. Other dangers are from fire and evaporation if open to the air.

In applying stain use a regular production type spray gun. A No. 30 air cap, FX fluid tip and needle will give excellent results with a minimum loss of material as overspray. A fluid tank pressure of 10 lbs. is adequate with a gun pressure of 35 to 40 p.s.i. for atomizing the liquid stain.

Only a few minutes drying time is required before going into the next operation if non-grain raising stain is used.

Importance of Padding Filler

Disappointing would be the results if filler were sprayed on the face of cherry furniture panels then wiped clean without forcing the mass into the millions of pores that cover the surface.

For one, filler is a solid (not a solution) made to flow by a carrier such as V. M. P. naphtha. Consequently it does not flow into the minute interstices as would a sealer or lacquer (a fluid by the physical action of a solvent acting upon a solid) which would evaporate and leave a thin film of matter within the openings.

The mass of filler must be forced into the wood pores not unlike a road scraper leveling ruts. For what would appear to be a well filled panel after spraying on the surface is a series of bridged openings. A few are filled by the flow of the carrier but the larger areas are still open.

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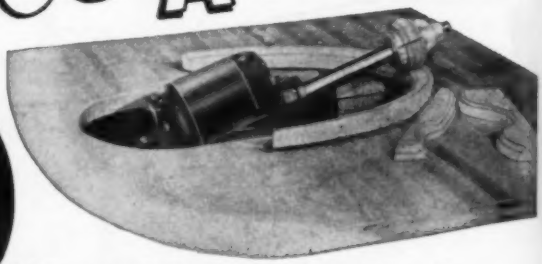

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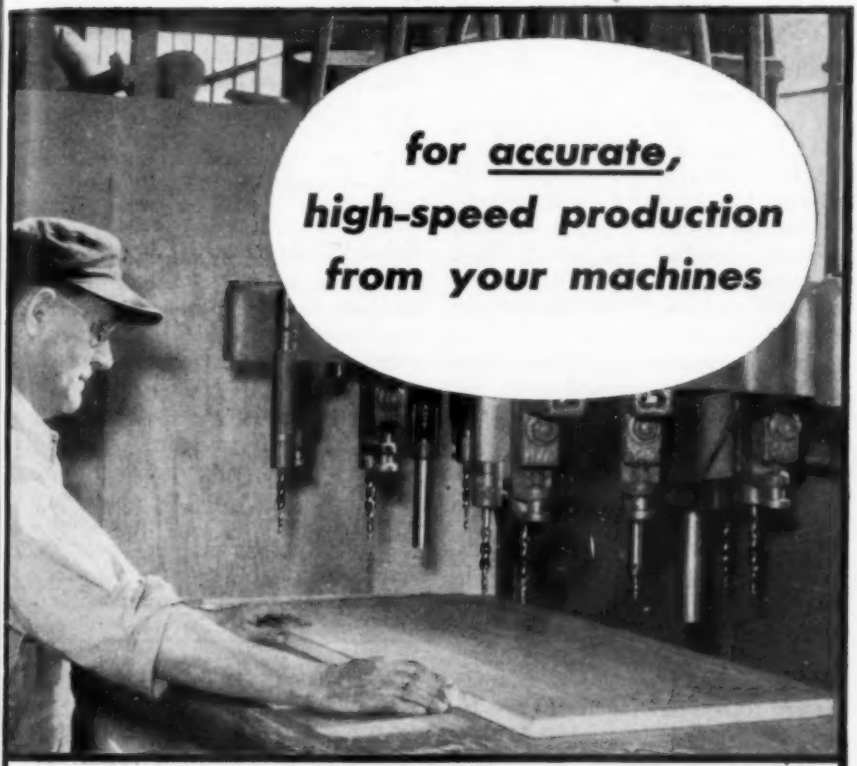
Two methods are used to accomplish padding: (1) hand wiping with jute or waste across the grain and (2) padding the filler mechanically into the grain with a felt pad. The first requires little explanation and much elbow grease. And even then for best results a circular, cross grain wiping with jute or rags while the filler is still wet improves the operation. After the surface has flashed (a dull dry surface caused by the evaporation of a portion of the thinner) the excess solids on the surface are removed by rubbing the panel across the grain thus forcing the open grain pores full.

A much better filling job can be obtained, however, by mechanical means as mentioned. Production is higher and consequently cheaper.



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Flexible Shaft Padding Machine

This method of padding filler has come into very large use during the past few years and, in many finishing rooms has proved practically indispensable. Excellent filling, at comparatively low cost, has accounted for its increasing use. A flexible shaft machine especially designed for wood filling comes equipped with soft felt pads and can easily pad in 400 surface feet per minute.

The wheel operates at 172 revolutions per minute and is attached to the end of a 6′ flexible shaft. This frees the operator from moving a heavy motor and allows enough freedom to walk about a chest of drawers or table without undue fatigue.

There are limitations, however, to even this type of padding machine. The chief objection being that padding of molding will cut through the washcoat and stain leaving a light edge. A manufacturer noticed this when first applying the rotary padding to a table top and discontinued the operation till it was pointed out the rotary felts should be kept inside the moldings and not allowed to drop over the side when moving over the surface.

A frame, of the table top thickness, was dropped around the top and the trouble was eliminated. On the other hand, this is impossible for surfaces with a raised molding. The solution is to keep the felts from the edges and pad in the small area with a "jitter bug" type that moves in one direction only or hand pad this small area with rags.

Other Padding Machines

Another hand tool often used for padding in filler is the reciprocating type of machine. It is powered by either electricity or compressed air.

Two felt pads, mounted on the bottom of the tool, reciprocates in opposite directions cancelling end thrusts and eliminating fatiguing vibrations in spite of the fact that pad movements are 3500 per minute. This balance of moving parts enables the operator to freely and easily guide the machine to produce the best padding possible. A small machine of this type may weigh as little as 6 lbs.

For heavy work, however, a larger machine weighing 30 lbs. is available. This type is air driven, requiring in the neighborhood of 80 lbs. per square inch.

An advantage of this machine over the smaller type is the increased padding area; approximately twice as great. The strokes are reduced to 1100 oscillations per minute with a stroke of

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E-30 OSCILLATING EDGE SANDER WITH TILTING TABLE

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1½" per minute. It is possible to pad two or three times the area normally covered by hand padding. Obviously this means a big saving in labor and a superb job of filling.

Due to the heavy weight, this machine is best for padding large areas such as table tops, TV cabinets, etc., where the fatigue of lifting the machine about is held to the minimum. When once placed on a filled surface for padding, very little physical exertion is required of the operator as he merely guides the machine over the surface so that padding is done uniformly.

Because these types of mechanical padding tools operate in a straight line, not elliptical or circular, many feel their filling action is superior because the padding action can be across the grain at all times.

After the filler has been sprayed or brushed on the wood, the padding action is started—usually before the surface has had an opportunity to flash. The reciprocation of the felt pads forces the filler into the pores and speeds the evaporation of the solvent.

This padding action is maintained across the grain until the surface is free of excess filler. Some advocate a short run-over of the surface with the grain. This can, however, be harmful as the pads are prone to pull the paste filler from the pores rather than pack into the grain.

Rather than trying to straighten out padding marks across the grain in this manner, use soft rags to wipe up by hand when finished with the portable tool.

(To be continued)

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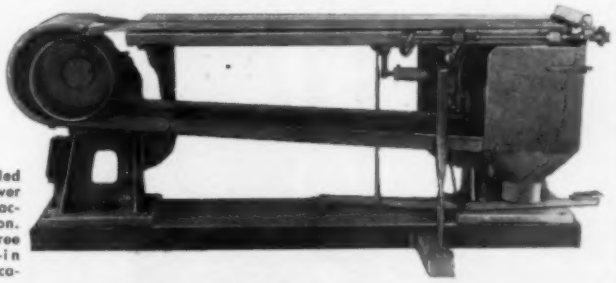

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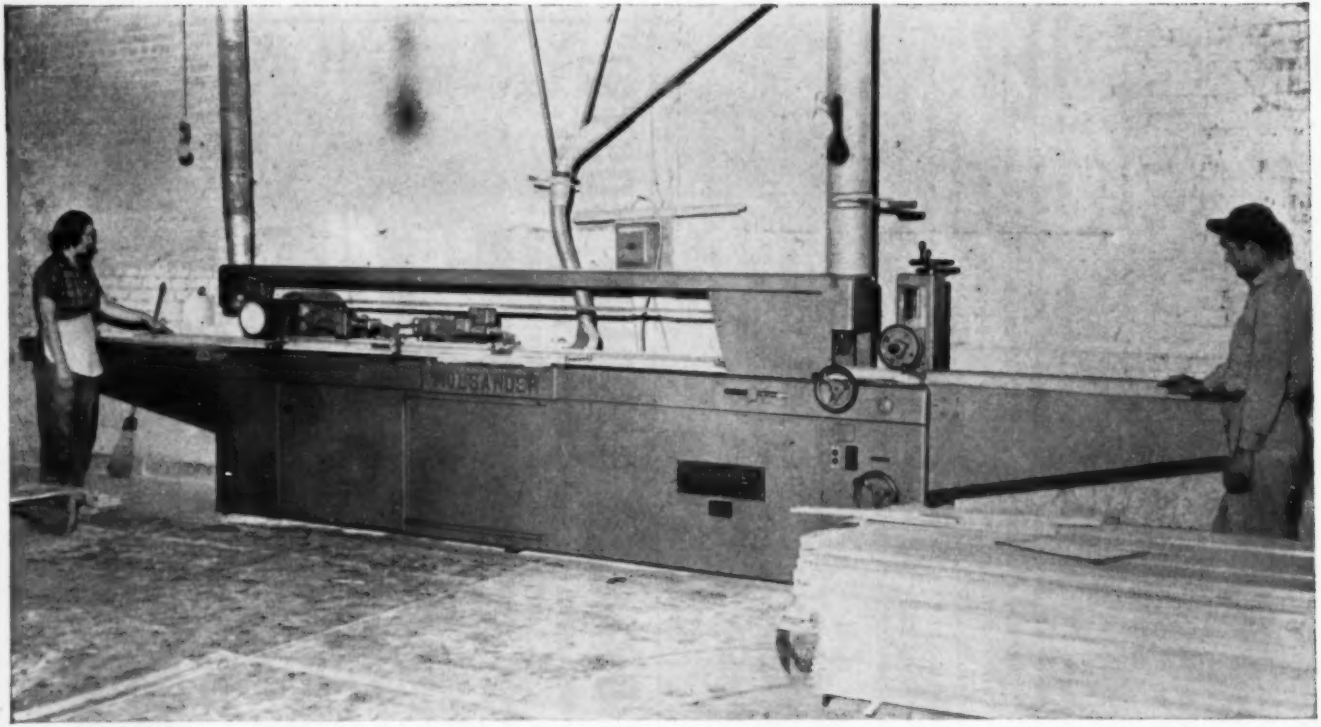

Photo above taken at Korn Industries, Inc., Sumter, S. C.

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It will handle work as wide as 8" or

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The Molsander can be equipped with either one, two or three form carriages (heads). Additional heads eliminate extra passes and provide greater variety of sandings. For sanding of fine beading and grooving, a motor driven Brush-Back sander head attachment is available. Other optional equipment includes Air Lifts for immediate raising of heads from work and a two speed sand belt motor with drum control for sanding or delicate shapes.

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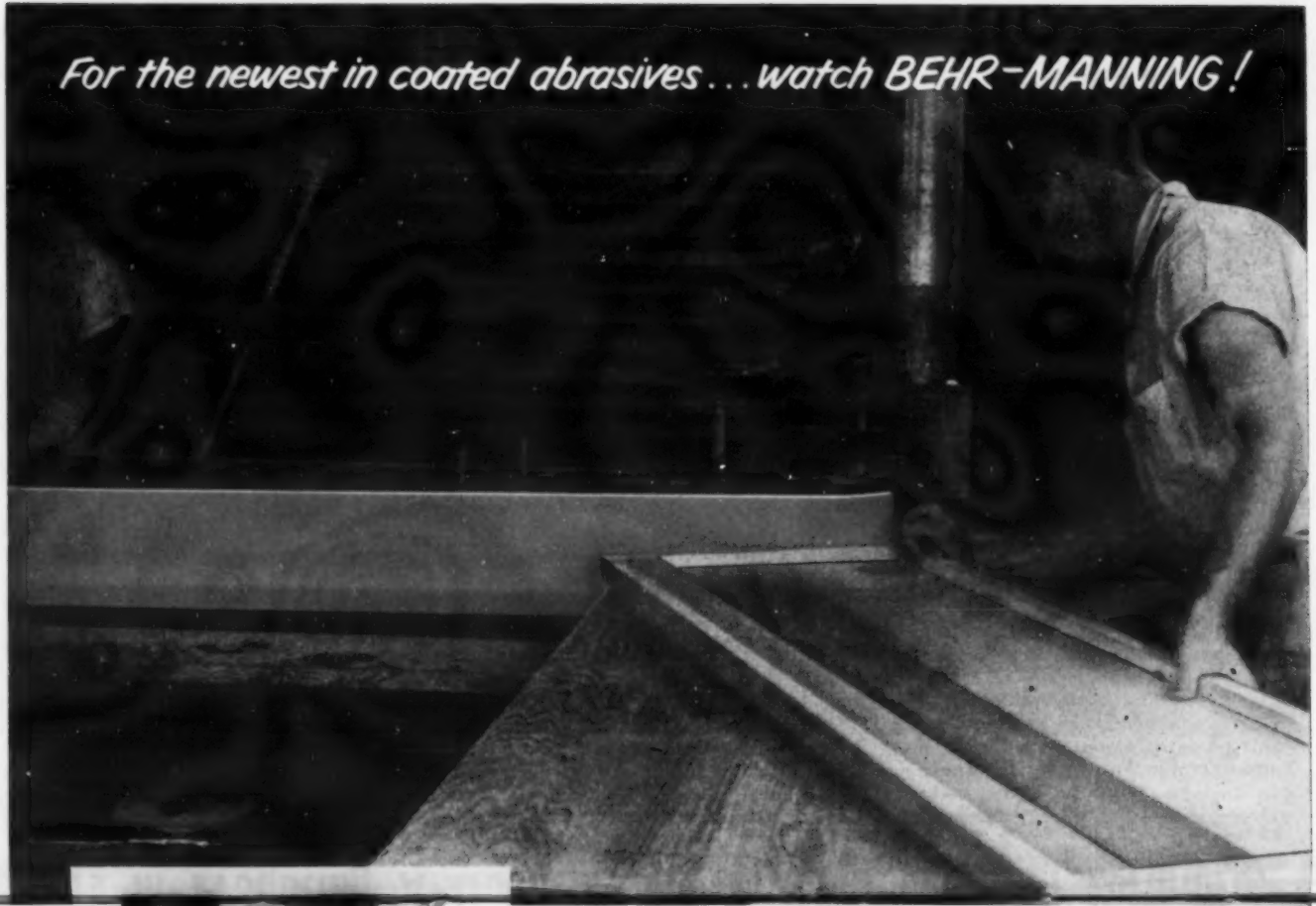

Photo, Oakley Oscillating Edge Sander

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GRAINING HARDBOARD CABINETS

By Paul H. Graham

MANUFACTURERS of solid wood and decorative-faced plywood TV and radio cabinets have had their sales in the low end lines reduced by competitive prices of metal and plastic cabinets to such an extent that they were driven to investigate other materials which might provide sufficient economy for successful competition with metal and plastic cabinets. Hardboard seems to be emerging as the competitive cabinet material with the best potential.

Roto edge graining machine features continuous feed belt for high speed graining.

Investigation has also shown that wood graining, as used to simulate wood grain on metal cabinets, can be used effectively in finishing cabinets made of hardboard. This finishing method and commercial equipment developed for its application has been improved to such an extent that wood graining is practically a continuous automatic process.

Surface Preparation

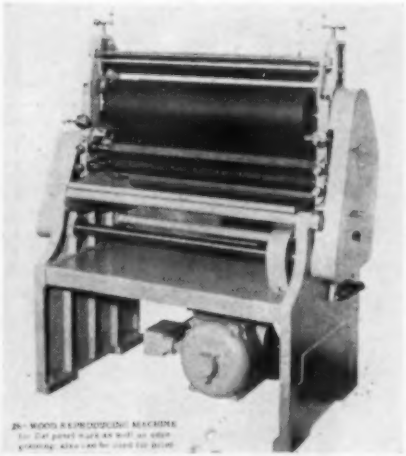
The basic finishing process for wood graining requires careful preliminary preparation of the hardboard, with the surface made clean, smooth and even. A sealer coat is then applied, dried and sanded smooth. A base or ground coat of proper color to serve as the graining ink background follows and is also dried thoroughly. The decorative wood grain design is then applied to the hardboard surface, either by hand or by machine, by means of an engraved plate or cylinder and an applicator roll. After the ink has dried thoroughly, two coats of clear lacquer, or similar topcoat material, are applied over the inked grain design to bring out the full color and to protect the surface design. After drying, the finished surface may be rubbed and polished, or may be left in a dull-flat or semi-flat condition.

The ground color should be a light

shade of the decorative cabinet wood to be simulated. The ground coat material is generally an enamel or lacquer-type paint formulated with low luster, since it is easier to print a dull surface and the ink itself adds no gloss. Colors built into the ground coat and inks come alive when the clear topcoat material is applied over them.

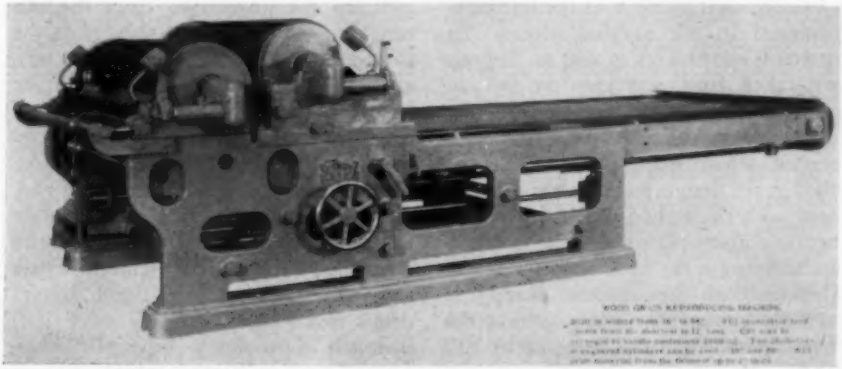
The ground coat may be applied by spraying, dipping, flow coating or roller coating, depending upon size and shape of the hardboard surface and kind of finishing material used. It may be air dried or oven dried. Roller coating seems to be preferred where hardboard is finished in flat panel form; spraying where assembled cabinets or cabinet sub-assemblies are finished.

Wood graining is essentially a form of wood printing, reproducing rather than imitating the natural wood decorative grain, complete with tone shading. The copper graining plate or cylinder used is essentially a photograph of the actual wood grain etched in copper, with the grain pattern photographed on copper and etched in the manner of a copper engraving.

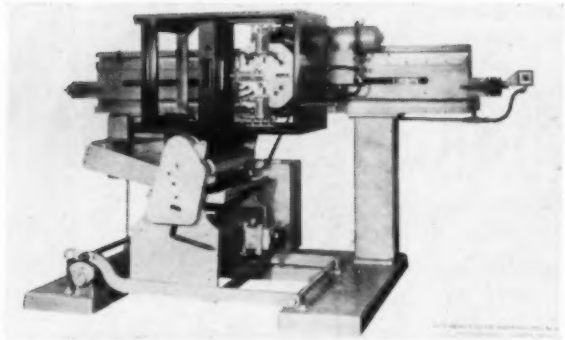


Schmutz horizontal wood graining machine feeds panels up to 12' long and up to 2" thick.

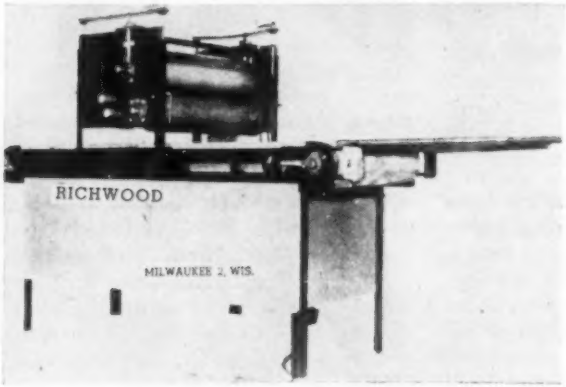
It is made up of a series of wells, up to 22,000 wells per square inch and varying in depth from 0.002-inch to 0.005-inch. The darker tones are produced by wells etched the deepest while shallow wells produce the lighter tones. The hardboard surface can only pick up ink left in the wells so that it is the plate rather than the operator which controls the depth of color.



Schmutz automatic wood graining machine for flat panel and edge graining is also adjustable to grain assembled cabinets.



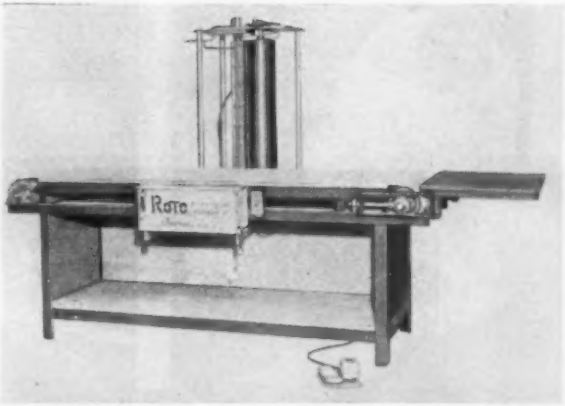
Schmutz automatic wood graining machine for graining assembled cabinets prints three sides automatically without removing the cabinet from the machine. The cabinet is gripped from the inside with air cylinders on a reciprocating carriage and is automatically turned 90 degrees between strokes 3 times to grain three sides of the cabinet.



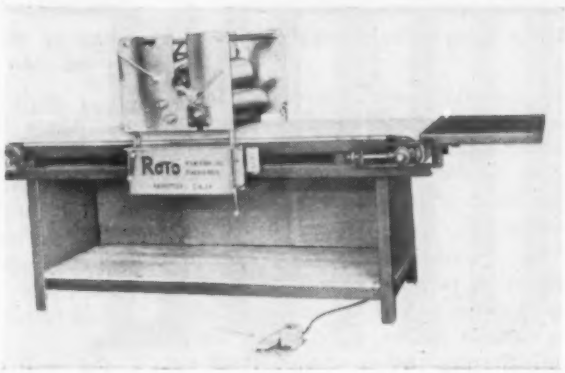
Richwood cylinder graining machine, with rollers in horizontal position, grains flat pieces carried through the machine with a conveyor belt at a rate of 50 f.p.m.

In the automatic mechanical graining process an engraved graining cylinder is usually used in place of the flat plate employed in the manual process. Its pattern is continuous so that an impression taken from any area on the engraved cylinder is representative of the cylinder as a whole. As used in a commercial wood graining machine the wood grain design roll is made of steel, faced with the etched copper plate, and then is chrome-plated to resist continuous scraping wear by the doctor blade. Thickness of the chrome plating is carefully controlled to ensure that the etched grain figure will retain its full design in sharp detail and not wear down smooth by constant use.

Gelatine grain rolls were first adapted from the manual graining process to pick up the impression from the ink engraved cylinder and apply it to the surface to be gained. Gelatine is soft, easily damaged and water soluble, so is subject to damage if water or liquid miscible with water is allowed to remain on it for an appreciable period Climatic changes affect gelatine to such an extent that it may be required to use a hard gelatine roll in summer and a soft gelatine roll in winter. These rolls tend to shrink if relative humidity drops much below 35% or swell if it is much above 80%—especially when temperatures are in the high 80's or over 90 degrees F.



Roto, horizontal and vertical wood graining machine, with rollers arranged for vertical operation for fast graining of assembled units.



Same machine arranged for horizontal operation for graining flat panels or partly assembled units. Operation speeds are optional from 55 to more than 100 feet per minute.

These deficiencies led to the development of synthetic rubber rolls which are longer lasting and more resistant to weather changes. Exponents of the gelatine roll feel that the advantages greatly outweigh the disadvantages. However, synthetic or rubber rolls have grain, making it more difficult to scrape off the marred print, and sometimes leave a light smear or color shading. They also do reduce considerably the need for sharpening of doctor blades for the offset roller.

Graining Machines

Commercial automatic wood graining machines may operate with the work passing through the machine between applicator roll and feed roll, or with the work held stationary while the applicator roll passes over the engraved plate and work surface. They are made in both horizontal and vertical models, or as a combination unit which may be easily adapted for horizontal or vertical applications.

Typical of the first classification is a machine which incorporates a rubber inking roll, a chrome-plated design roll, a medium-hard applicator roll, and a power-drive feed roll. A machine using

Manual inking of the graining plate.

Picking up the inked grain design on the graining roller.

the stationary work principle has a long metal frame which supports a rubber applicator roll, a copper graining plate, a table to hold the work, and a conveyor track which carries the power-driven roll.

In operation of the first machine, ink in the pan in which the inking roll operates, is picked up and transferred by contact to the wood grain design roll. Surplus ink is scraped from the design roll by a doctor blade, leaving ink only in the etched design. The grain figure is picked up by the applicator roll through contact with the design roll, and is transferred directly to the surface of the work as it passes between the applicator roll and feed roll. Another doctor blade contacts the applicator roll to remove the residue of the inked design before it again contacts the design roll. This prevents blurring of the grain figure when the design roll is contacted to receive a fresh impression.

In the second machine's cycle of operation the applicator roll runs over the inked plate to pick up the grain impression. After surplus ink is removed by a doctor blade the roll then travels over the work, placed on the work table, by means of a conveyor track. When the machine carriage reaches the end of the rail, the roll is automatically raised, the motor reverses, and the roll is carried back to its starting position.

For graining assembled units, the worktable is removed and the unit is placed on a dolly in the same relative position, with the graining operation then being performed in the same cycle as used for flat panels.

These automatic wood graining machines are designed to grain both flat and curved surfaces. Machines incorporating the engraved cylinder and carrying the design or printing roll in a vertical plane are generally preferred for graining prefabricated parts. Machines operating in a horizontal plane are used chiefly for graining flat or curved surfaces of panels before fabrication. Some very ingenious auto-

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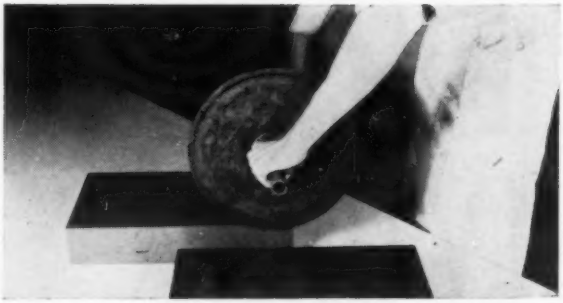


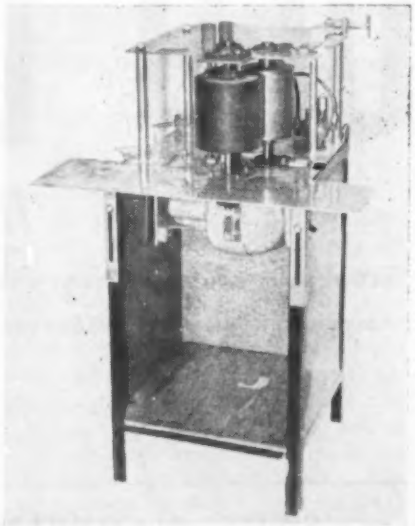
Transferring the inked grain design to the work surface.

matic equipment has been designed to handle quite complex shapes.

A typical combination machine which operates in either the vertical or horizontal position has a conveyor belt driving the full width of the graining surface. It is designed to handle either fully assembled cabinets or panels. It is possible to change this machine from vertical to horizontal or vice versa in a few minutes. Its operating speed can be adjusted from 55 to 100 f.p.m. The conveyorized belt feed may be arranged to feed continuously or just intermittently.

A recently developed automatic horizontal graining machine, said to be favored for graining assembled cabinets, operates to print three sides of the cabinet automatically without removing it from the machine. The cabinet is loaded in proper position for graining, held securely by air

Cleaning the graining roller.



Roto vertical edge graining machine prints straight, round or curved surfaces and may be arranged for automatic or manual feed.

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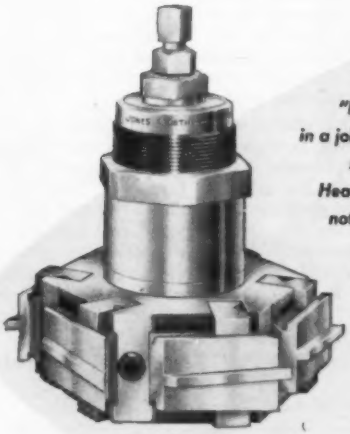

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clamps on a reciprocating carriage, and is moved forward to contact the applicator roll for transfer of wood grain design. The applicator drops out of contact as the cabinet moves back to starting position. Before moving forward again, the cabinet is automatically turned 90 degrees to present a fresh surface for graining. This is done three times to grain three sides.

This wood graining process is currently being used to finish solid wood and plywood products, other than cabinets, and is becoming very popular with the furniture trade.

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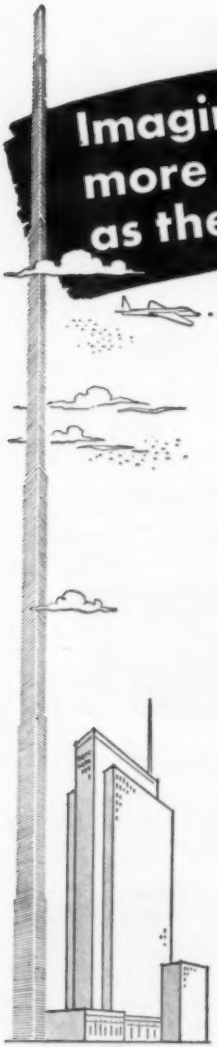

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Plywood Farm Buildings

Beautyguard In Use At Period Tables Co.

BEAUTYGUARD in Use At Period Tables Company

By John Huling

Assistant Secretary, Fine Hardwoods Association

THE CAREFULLY laid plans of George Snyder, president of Period Tables Company, Henderson, Kentucky, have resulted in a smooth-flowing production of cigarette-and-liquid-resistant topped tables. Period is one of a growing list of companies taking advantage of all recent developments in the Beautyguard process whereby tested and approved finishes and aluminum foil are used in fine hardwood tops to gain abuse resistance. These developments are detailed in the Beautyguard Process Report—available from the Fine Hardwoods Association, 666 Lake Shore Drive, Chicago 11, Illinois.

Beautyguard is the name coined by the Fine Hardwoods Association and adopted for use by the panel, furniture, finish, and hardwood plywood industries. This term describes a top which has specially treated and tested foil laminated into the panel just below the face veneer. Further, the top must be finished with a tested and approved heat and liquid-resistant finish. Tests are carried out and ratings are given independently by the Timber Engineering Company laboratory in Washington, D.C. Maintaining the established standards of plywood bond and top resistance protects suppliers, producers, and consumers alike.

Snyder's production and marketing experience with plastic tops had been a long and steady battle. This experience led the firm to make a dealer survey at the 1956 January furniture market in Chicago which readily established the fact that dealers would buy well-styled, medium priced, genuine hardwood, occasional tables with the new built-in resistance to liquids and cigarettes. It was then merely a matter of making minor adjustments in production steps in order to turn out desirable

Opening box of Reynolds coated foil for use in Beautyguard table tops at Period Tables Co. Edward Overton opens box while George Snyder looks on.

tables. Style, color, and species of hardwood were recognized as vital factors. Due consideration of these factors led to the modern Danish grouping with a light colored finish on pecan wood. Other groupings also were scheduled for Beautyguard treatment.

Quality Control

Conferences with Reynolds Metals Company, Reliance Varnish Company, and Fine Hardwoods Association, determined that production controls would have to be exercised at all stages in order to turn out a quality product. Fortunately, Period Tables Company was in a good position when it came to men, design, materials and machines. Especially concerning the human element, Snyder's foremen were wholeheartedly in favor of successfully establishing the new process and each worker in the plant was given to understand the desired results and the importance of his particular function.

Basic Features of Beautyguard

Every person in production and sales was briefed on the basic features of the process and how each is interrelated. When Neil Ward of Chicago obtained his patent for the process in 1934, and when DuPont bought it for the furniture industry in 1944, it was still an untried process in production. Questionable features, such as bond strength between foil and wood in lami-

Cutting Reynold's coated foil to length. Foil is mounted on a suspended spool in box. After opening, box can be placed on its side and foil unrolled along measuring lip on cutting table. Thomas Bennett using knife. Paul Marstall, mill and veneer room foreman, in background.

Pecan face veneers coming through glue spreader face to face for coating backsides. Note tackiness of glue indicating low water content. James Green, receiving; Henry Judkins, spreader operator.

Applying coated crossband to banded chip-core. James Green holding crossband, Thomas Bennett ready to add sheet of foil.

nation and resistance and durability of the necessary finish materials, had to be resolved by exhaustive laboratory and field work.

This work, coordinated by Fine Hardwoods Association, made clear that complete control of moisture is the crucial feature for proper lamination. This was the first detail to be resolved at Period Tables Co.

Raw Materials

Faces, backs, crossbands, and cores are held at 5% to 7% moisture content. With the foil acting as a moisture barrier, and with wet glues added to the back side of the face, double trouble had to be avoided. The top crossbands, especially, needed to be selected for cleanness and ability to absorb moisture that would normally go into the face.

Paul Marstall, mill and veneer room foreman, soon proved this when he found that thin veneer core panels would "blow," whereas thicker panels would not under the same conditions. This problem was resolved by allowing a greater flash-off or closed assembly time for the thinner panels, thereby reducing the amount of moisture which had to be absorbed. Marstall also verified the fact that larger panels have to be given a longer closed assembly time than small ones. This time was established as 30 minutes for lumber core panels, 45 minutes for 3′ square 5/16″ veneer core panels, and under 30 minutes for 18″ x 13″ veneer core panels.

Beautyguard panels stacked in closed assembly rack prior to pressing. Berthelsen press in background.

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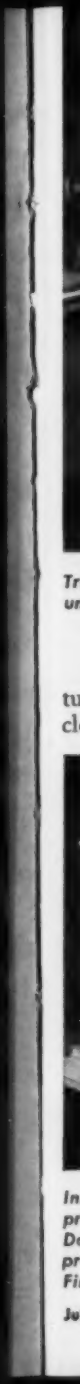

Trimming Beautyguard lumber core panels in Greenlee double-end tenoner. Calvin Blackwood unloading dolly.

The problem was to eliminate moisture in the glue; allow for the longer closed assembly time prior to pressing; and, at the same time, hold the glue line temperature in the press below the boiling point. Borden's representative was called in for consultation.

Inspecting Beautyguard panels just out of the press. Left to right: W. P. Andrews and Alex Downing, Reynolds Metals Co.; George Snyder, president, Period Tables Co.; John Huling, Fine Hardwoods Association.

A press schedule for the three-opening Berthelsen press of 210-215° F, 3½ minutes, 140 lbs. pressure, was established. A pot mix containing only 13% flour, but with total pot solids of over 65% was established. This change recognized that a large amount of flour in suspension only weakened the glue line at the foil line, and it gave a highly concentrated urea formaldehyde mix, low in water but still fluid enough to be handled by the spreader. At the same time, sufficient retarder was added to allow for lengthened closed assembly period consistent with required pot life.

Spread

Marstall established his glue spread at 34 lbs. per 1000 square feet. Run-

Returning partially trimmed Beautyguard lumber core panels for final trimming in Greenlee double-end tenoner. Clyde Wilkerson pulling dolly, Calvin Blackwood, pushing.

ning the two 1/28″ faces through the spreader face to face gave half a line of 12 to 14 lbs. Even with the small amount of flour in the mix, bleed-through in the pecan faces was negligible.

The long closed assembly time prior to pressing was easily handled by building a wooden rack with seven shelves, each shelf strong enough to hold six panels. In this way the time gap between lay-up and pressing was introduced, along with a method for getting the panels in a position where air currents could pick up volatile moisture.

The rack was made of two uprights, 2″ x 6″, backed with plywood and with 2″ x 4″ arms bolted every 12″ apart. Arms are 24″ long. Eventually a dead roller system may be used for stacking and moving assembled panels.

Handling Foils

Period Tables Company is using Reynolds foil No. FX531, suitable for low temperature hot press or cold press with urea resins. Foil is ordered through Alex Downing, local representative, and is purchased by the pound. A pound of foil approximates 25 square feet. Several different widths are available. The foil comes mounted on a wooden spool, which is suspended in a wooden box. Marstall set up a cutter table made of 4′x8′ plywood sheets, with a hardwood guide and measuring edge on one side. Instead of butting the plywood ends, each end is covered with an L-shaped iron strip and a 1/16″ gap left to run the cutter knife. The thin foil is cut by hand with a linoleum knife.

Machining

Panels out of the press are carefully inspected for defects of any kind.

Greenlee

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B&B
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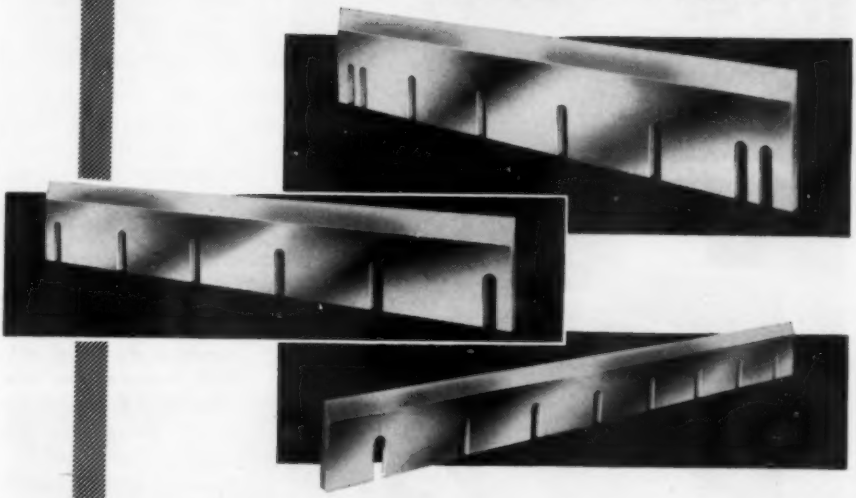
REGISTERED

Symbol of
Long Life
VENEER KNIVES



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B & B DIVISION
LODDING ENGINEERING CORP.
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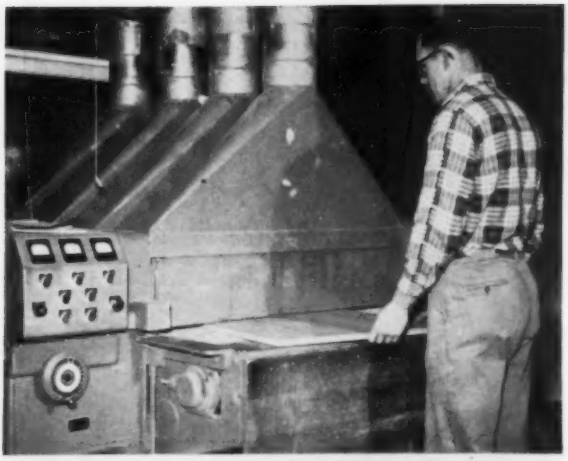


Rough sanding Beautyguard panels on Sheboygan triple drum sander, using 000 sandpaper. Approximately 1/64" is removed from the face.

Polish sanding Beautyguard panel on Curtis automatic stroke sander with 0000 sandpaper. Final face thickness is approximately 1/56", giving maximum cigarette resistance. Operator is "Spokes" Hargis.

Marstall is considering a future quality control measure at this stage whereby random samples would be taken from daily runs for bond testing.

From the press, rough panels are taken to the Greenlee No. 545 double end tenoner. Carbide tipped saws are used and, with normal Beautyguard production, give three months service per sharpening. Routing and shaping of the tops presents no problem.

Sanding—Key to Good Finish and Cigarette-Resistance

As a number of tests have shown that cigarette-resistance is inversely proportional to the face thickness, careful control at Period Tables is given to the sanding operations. Panels with 1/28" faces are finish sanded to 1/56" face thickness. This is accomplished in two operations. The first is a rough sanding in the Sheboygan three-drum

Applying Relvar top coat to Beautyguard table. Coating is 38% solids and is force dried for 2 hours at 130 degrees. Al Haire is handling gun.

sander using 000 sandpaper. The second is a polish sanding operation on the Curtis automatic stroke sander using 0000 sandpaper.

Finishing

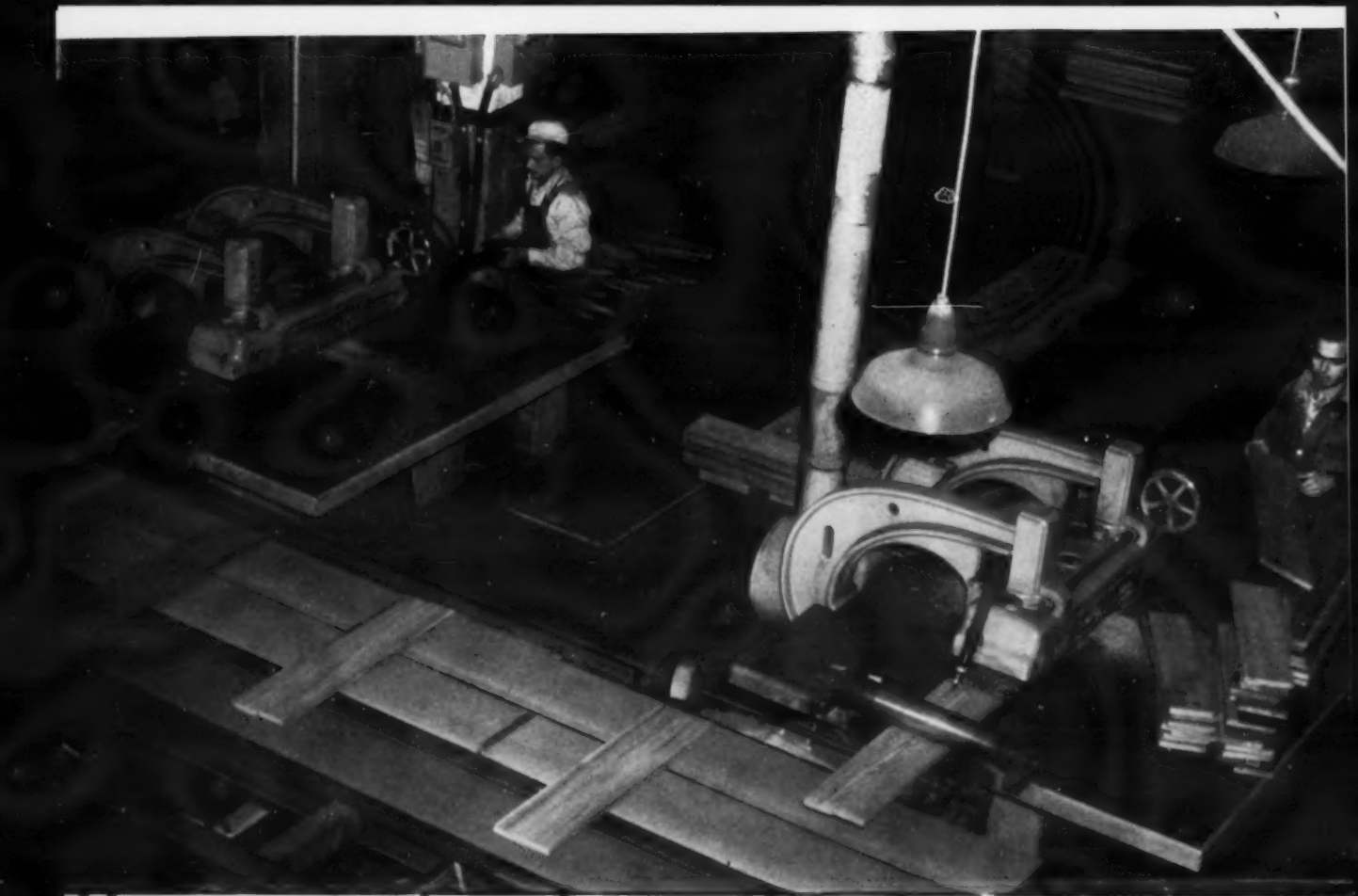
When it was decided to introduce Beautyguard tops into production, Edward Fruit, finishing foreman, was assigned the task of switching his system from lacquers to the tough, resistant "synthetics." Reliance Varnish Company, Louisville, Kentucky, was the selected finish supplier. Relvar was one of the original synthetics to be given an acceptable Beautyguard rating by Timber Engineering Company laboratory tests.

Polishing Beautyguard top with Sundstrand double vibrating polisher. Oil and mineral spirits mix being used. Thomas Williams is the operator.

Again in finishing, the importance was recognized of not adding heavy moisture coats to the face with subsequent swelling, and then shrinking the face by subjecting the table to long periods of high heat. Typical Danish grouping tables are finished as follows: first they are sprayed with toner and allowed 30 minutes of air drying. Tables are then given a wash coat, air dried 30 minutes, and sanded with 7-0 stearated paper. Next they are filled and padded with specially prepared, fast-drying filler. This is dried for 90 minutes under 130° of heat. Because of the quick drying filler, two more men are used at this stage for cleaning.

A cut down top coat is used for sealer and it is given a 20 minute flash-off period before undergoing 130° of heat for one hour. This sets the coat but does not cure it, thus permitting good knitting and adhesion with the final top coat. After cooling for 10

(Continued on page 138.)



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Features include heavily ribbed welded-steel base, heavy-duty pressure bar arms, completely sealed pressure roll bearings, solenoid lubrication to chain and race, and easy removal of sawdust.

The No. 750 is available in right or left hand models, and offers speeds up to 250 fpm and handles stock from ⅛" to 4¼" thick and as short as 7". Table width is 25" to right of blade and 37" to the left.

This is only one example of the complete line of woodworking equipment offered by Diehl. Other machines include the Nos. 99, 990 and 909 Multi-Rip Saws, No. 725 Automatic Cut-Off Saw, No. 890 Tapeless Veneer Splicer, No. 69 Veneer Jointer and Edge Gluer, No. 660 Lumber Jointer and Edge Moulder and 4"-6"-8" and 12" Moulders.

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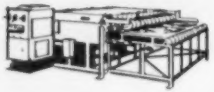
4"—6"—8"—12" Moulders

No. 99 Multi-Rip Saw

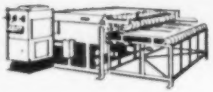
No. 890 Tapeless Veneer Splicer

No. 69 Veneer Jointer and Edge Gluer

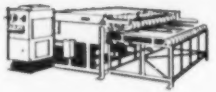
Diehl



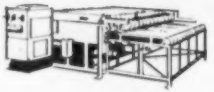
Anacortes Veneer, Inc.
Anacortes, Wash.
One 10' Unit (On Order)



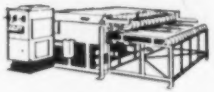
Arcata Plywood Corp.
Arcata, Calif.
One 8' Unit



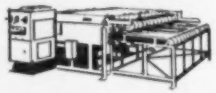
Bate Lumber Co.
Merlin, Ore.
One 8' Unit (On Order)



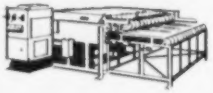
B. C. Forest Products, Ltd.
Victoria, B. C.
One 8' Unit (On Order)



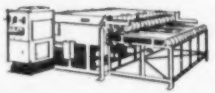
Bohemia Lumber Co.
Culp Creek, Ore.
One 8' Unit (On Order)



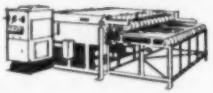
Bradley Plywood Corp.
Savannah, Ga.
One 8' Unit



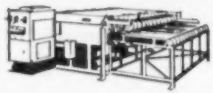
Brookings Plywood Corp.
Brookings, Ore.
One 8' Unit (On Order)



Canadian Forest Products, Ltd.
New Westminster, B. C.
One 8' Unit



Cascades Plywood Corp.
Lebanon, Ore.
One 10' Unit



Commonwealth-New Guinea Timbers, Ltd.
Sydney-Lae, N. G.
One 4' Unit

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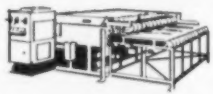
Rely On The

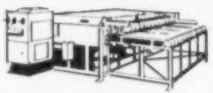
Mann-Russell Electronic

Continuous, Flat-Plane

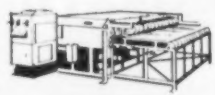
VENEER EDGE-GLUER



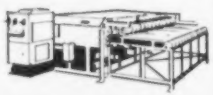
Cypress Mining Co.
(Timber Products Div.)
Medford, Ore.
One 8' Unit (On Order)



Diamond Lumber Co.
Tillamook, Ore.
One 8' Unit

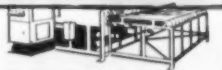


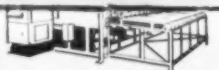
Harbor Plywood Corp.
Aberdeen, Wash.
One 8' Unit



M & M Wood Working Co.
Portland and Lyons, Ore.
One 8', One 10' Unit

MORE and more, plywood manufacturers are recognizing the distinct advantages of the

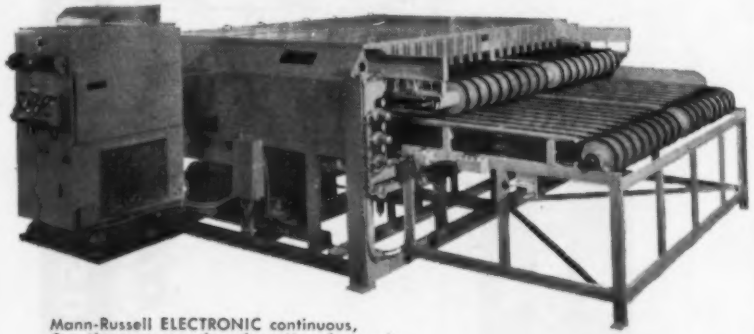




Continuous, Flat-Plane

VENEER EDGE-GLUER

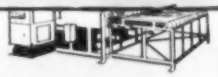
MORE and more, plywood manufacturers are recognizing the distinct advantages of the Mann-Russell ELECTRONIC veneer edge-gluer. With a Mann-Russell unit—engineered to meet modern plywood mill requirements—you get all these plus-factors: greater output per man-hour . . . . lowest power consumption for any continuous gluing process . . . increased veneer recovery from the available log supply. It will pay you to investigate the Mann-Russell system thoroughly—now. Write, wire, or call collect: MANN-RUSSELL ELECTRONICS (Northwest Syndicate, Inc.), South 23rd and Pacific Ave., Tacoma 2, Washington, FUlton 1593.



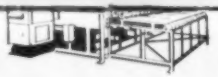
Mann-Russell ELECTRONIC continuous, flat-plane veneer edge-gluer. Manufactured in 3 standard sizes: 4', with a 50" maximum stock length; 8', with a 103" maximum stock length; 10', with a 126" maximum stock length.

Harbor Plywood Corp.
Aberdeen, Wash.
One 8' Unit

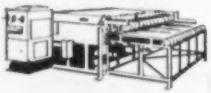
M & M Wood Working Co.
Portland and Lyons, Ore.
One 8', One 10' Unit



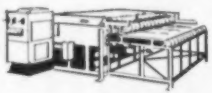
MacMillan & Bloedel, Ltd.
Alberni and Vancouver, B. C.
One 8', One 10' Unit
One 8', One 10' (On Order)



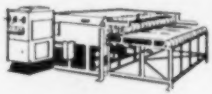
Mutual Plywood Corp.
Eureka, Calif.
One 8' Unit



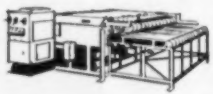
Nickey Brothers, Inc.
Memphis, Tenn.
One 4', One 8' Unit



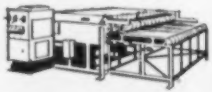
Northern California Plywood Co.
Crescent City, Calif.
One 8' Unit



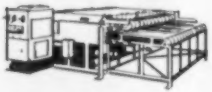
Roseburg Lumber Co.
Dillard, Ore.
One 8', One 10' Unit



Soake Lake Lumber, Ltd.
Victoria, B. C.
One 8' Unit



Southern Oregon Plywood Corp.
Grants Pass, Ore.
One 10' Unit



Western Plywood Co., Ltd.
Vancouver, B. C.
One 8' Unit

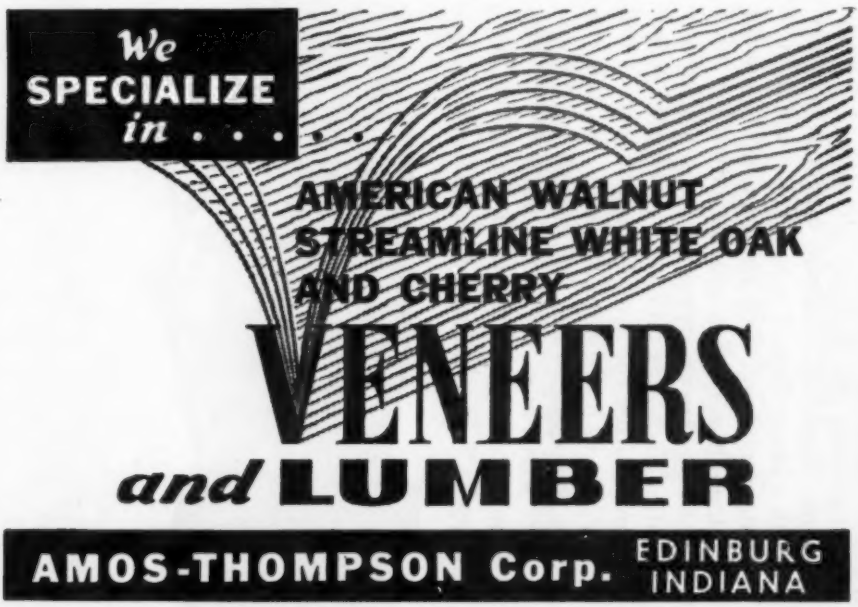
minutes, the sealer is scuff-sanded with 7-0 paper. Tables are then inspected and patched if necessary, then tack-ragged off.

A final coat of water white Relvar (38% solids) is then applied in the DeVilbiss booth using a No. 704 nozzle, 80 lbs. of air and 35 lbs. tank pressure. After 20 minutes flash-off, tables are dried 2 hours at 130° and allowed two to four hours cooling before machine rubbing. Initial rubbing is done with double vibrating No. 2165 Sundstrand sanders, using 360 weight paper with an oil and mineral spirits mix. Machine marks are eliminated by hand padding with Relvar rubbing compound. The resultant table comes out with a top coat sheen of 60.

Fruit has found that one of the greatest advantages of Beautyguard tops is that the entire table can be finished as a unit and that the tops—unlike plastic—do not require masking and special handling. The total square foot cost of a finished Beautyguard top is only a few cents more than a standard hardwood plywood top.

To tie in with all national publicity and advertising, Snyder makes use of the black and gold Beautyguard label and tags supplied by Fine Hardwoods Association. This coordinated publicity and advertising enjoins the support and cooperation of panel producers, finish suppliers, Reynolds Metals Co., glue suppliers, and others. Dealers have been notified of the program and of the availability of fact information and display aids to help merchandise tables.

George Snyder feels that Beautyguard opens new marketing vistas to the furniture industry.



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- 3-KNIFE CUTTERHEAD MOUNTED IN PRECISION BALL BEARINGS
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Send full details on the complete line of Powermatic Planers.

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POWERMATIC
MACHINE COMPANY
McMinnville • Tennessee

PLYWOOD For Farm Buildings

By Thomas D. Perry

THE light weight, large available areas, distributed strength, workability and rigidity of plywood, to mention only a few of the more important qualities, are particularly advantageous in farm buildings.

Farm buildings must be sturdy and durable and are not only subject to hard service, but must withstand all kinds of weather conditions in all sorts of climates, ranging in the United States and Canada, from many degrees below zero to temperatures well above 100° F. Rain, snow, hail and wind will inevitably take their toll from such buildings, not to mention high humidities and extreme dryness. An actual example of many years of severe service in an early plywood structure may illustrate this point.

Durability of Plywood

While the manufacture of Douglas fir plywood dates from about 1905, it did not become significantly important until about 1925. At that time waterproof adhesives were practically unknown and exterior types of plywood, that were thoroughly weather-proof, did not become commercially available until ten years later. By 1935 phenolic

Fig. 1. Hog farrowing house of exterior type plywood. Built, 1939; photographed, 1952.

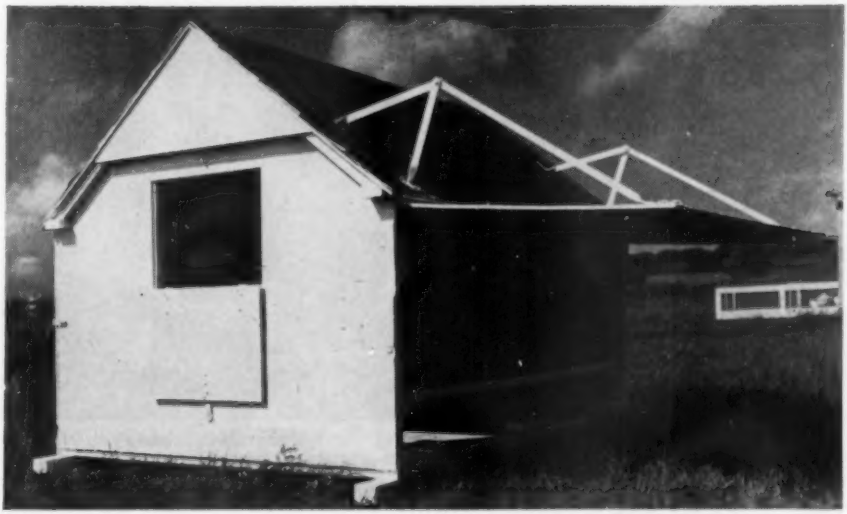

Fig. 2. Hog farrowing house of exterior type plywood as remodeled in 1952.

resin adhesives and hot pressing had gained a foothold in west coast plywood mills. This exterior type plywood appeared to meet exacting requirements in the laboratory, but its fate in the world of hard service was still to be demonstrated. There is often a wide gap between theoretical performance and actual usage, which includes the economic factors of marketability.

The Veterinary Research Institute of Iowa State College needed a hog farrowing house of modest size, one that was light enough to be readily moved around on skids; that could be thoroughly fumigated; and that would facilitate isolation studies in the diseases of swine. Exterior type plywood seemed to meet the needs better than any other available material, although plywood's durability under such severe service was wholly problematical. Nobody knew, but the research staff took the long chance and won! A hog farrow house, about 10′ x 15′, was built in 1935, sides, door and roof being of exterior type plywood and not painted. It was thoroughly fumigated at least once a year by scraping, scrubbing with a boiling hot lye solution and rinsed with boiling water. This cleansing process, in 1949, was modified to steaming with a strong detergent solution.

The photograph in Fig. 1, was taken in 1952, after 17 years of the hardest possible service and exposure. Its appearance is considerably stained and more or less battered, but structurally it was as sound as the day built. So far as known it is the oldest plywood structure that has been in continuous use under normal weather exposure. It was repaired and remodeled in 1952 as is indicated in Fig. 2. The original plywood was continued in use, and sides hinged for lifting up during warm weather to provide complete ventilation. This structure is still in use, and after 21 years, adequately demonstrates the

Fig. 3. Smaller hog farrowing house.

Fig. 4. Prefabricated hogcote at Michigan State College.

sturdiness and durability of exterior type Douglas fir plywood.

A very similar hog farrowing house was developed at Purdue University. The sides were permanent, but the roof could be lifted for thorough cleaning.

A smaller type of hog farrowing house, also developed at Purdue University, is shown in Fig. 3. Here the roof is in two sections, hinged both for easy cleaning and ventilation in clear weather.

A similar structure, with an arched

Fig. 5. Hog barn at Purdue University.

Fig. 6. Cattle range feeders.

roof, is illustrated in Fig. 4, which was developed at Michigan State College, and offers considerable simplification in the frame work, but without the lifting roof.

A hog barn, built at Purdue University, is shown in Fig. 5. Here the entire interior and exterior are of weather-proof plywood, including the partitions between the individual pens.

Plywood Structure for Cattle

The small plywood units shown in Fig. 6 are cattle range feeders, with hinged roofs to facilitate loading the central bins with a supply of feed, adequate for several days. The grain in this bin empties gradually into the feed troughs on both sides. The units are mounted on skids and are easily moved by tractor to any desired location on the range.

Fig. 7. Curved plywood feeding trough.

It is interesting to note that cows and their progeny, raised in the northern tier of states, seem to thrive under exposure to cold weather. Calves that are sheltered in closed barns or heated structures appear to develop far more diseases than those that are raised in the open.

After some study the staff of the Washington State College, devised an open and unheated shed, to give protection against the prevailing winds out of the west, with the eastern side entirely open. The walls and roof were of plywood, tightly fitted together to prevent drafts and the infiltration of winds and rains. This east side opened on a corral, which could be divided into a series of pens if desired. The shed was about 80′ x 30′. A feeding manger against the inner wall, under the windows, kept food dry and clean.

When this shed was completed, a

(Continued on page 146.)

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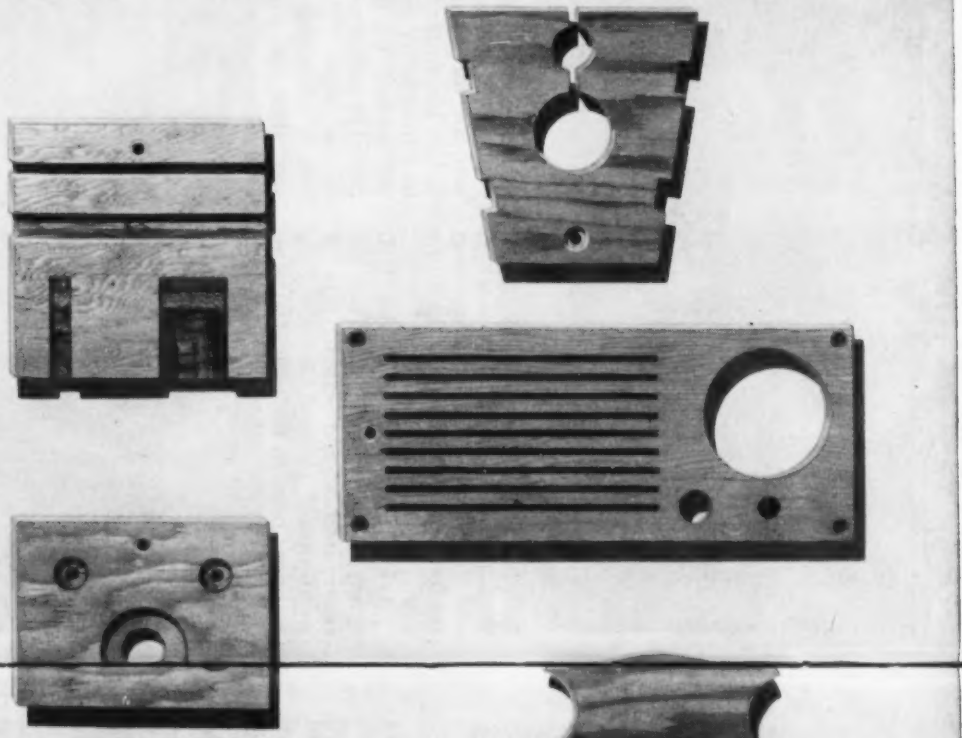

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Bullnosing

Slotting

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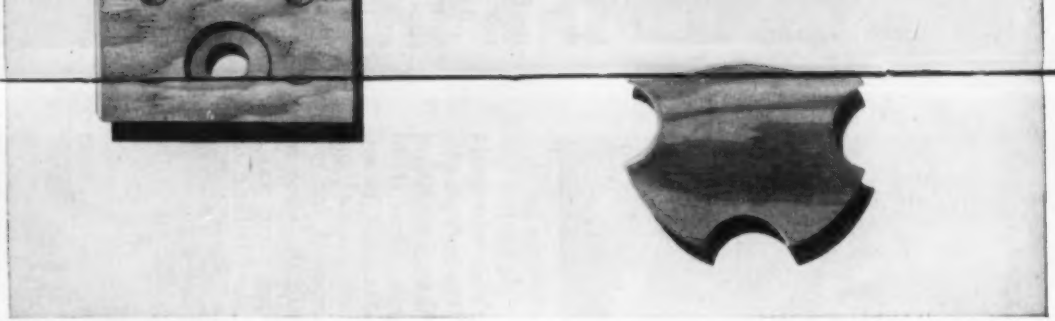

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Fig. 8. Rollaway nest unit.

comparative test was arranged with new born calves, Jersey and Guernsey, 2- and 3-days old, to be raised for dairy purposes. Eight calves were kept in this open sided shed, and were given normal care and feeding. Another like number in the same general area were protected in heated barn enclosures.

Fig. 9. Egg cooling unit of plywood.

The winter was a tough one with weeks of near zero weather. The only casualty to the calves in the unheated open shed was one frost bitten nose. Those raised in the heated barn not only gained less in weight, but some sickened and died. The test was repeated for two succeeding seasons with the same results. As a consequence there was a complete revision of the "Bulletin on Raising Dairy Calves," strongly advocating this open shed method, which is now the approved procedure in the state of Washington.

Another ingenious use of plywood in the dairy industry is the plywood feeding trough illustrated in Fig. 7, and developed at Purdue University. A sheet of ¼" fir plywood was curved at one edge for about half its width, using a three roller curving press. This curved plywood sheet was firmly nailed to concave end and center supports and provided with ⅛" plywood ends. Small bleed holes were drilled in the lowest section of the curved plywood to drain away the water used in

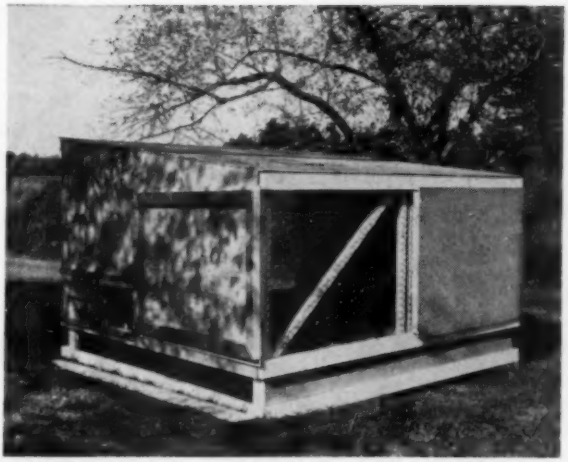

Fig. 10. Poultry range shelter.

flushing out the trough for cleanliness. Subsequently these plywood feed troughs were considerably narrowed to save floor space, but similarly curved.

Poultry Structures of Plywood

The rollaway nest unit shown in Fig. 8 is a compact and easy moved egg laying receptacle, requiring five full sized plywood panels, ¼" and ⅜" thick. The completed unit provides three nests, with outside dimensions: 3' high and wide by 4' long. An arrangement is provided whereby freshly laid eggs roll down on a screen, where they can easily be collected. The back of the nests and the floor under the screen can be removed for frequent cleaning. After a month's trial, one California poultry raiser built 100 of these for his farm. These nest units can be mounted on wheels to be moved around according to the weather.

Fig. 11. New plywood barn at Purdue.

Fig. 12. Plywood seed boxes for storage.

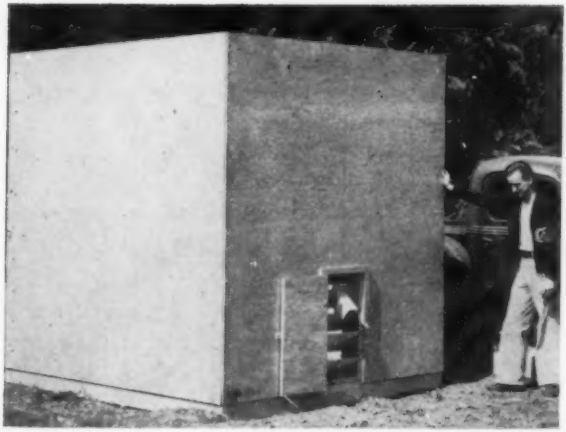

Fig. 13. Mammoth grain bin of plywood.

Plywood is found to be very useful for enclosing egg cooling units, as is indicated by the photograph in Fig. 9. The walls are double with aluminum foil insulation between. The door is similarly insulated. The long door knob shank is a bit of Yankee ingenuity that permits a man to turn the knob with the hand that also carries an egg basket, and saves setting down or tipping the egg basket as would be necessary with a normal door knob. This cooler was developed by an egg producer in the state of Washington.

The poultry range shelter shown in Fig. 10 was developed at the Uni-

Fig. 14. Bulk storage and feeding equipment.

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versity of New Hampshire, and may be with or without a plywood floor. Both front and back consist of wide opening double doors with netted openings. This is also a movable unit sliding on skids.

General Farm Structures

Plywood is equally useful for general farm buildings, in addition to the more or less specialized structures that have already been outlined for pigs, poultry and cattle.

Plywood can restore an old barn, flimsy and sagging from age. There was neither time nor money to rebuild, and it was essential that the barn be kept in continuous service. As an alternate the entire outside of the structure was sheathed with ⅜″ fir plywood, using full sized 4′ x 8′ sheets. Panels were shiplapped at the edges and given a primer coat of aluminum paint. Galvanized nails were used, with particular attention to thorough nailing to the old studding. The large sheets of plywood added amazingly to the rigidity of the structure, and there was no interference with the normal use of the barn interior. The large panels covered the surface rapidly, and in the matter of a few days the plywood exterior of the barn was ready for its final coat of gray paint. The success of this venture led to many similar renovation jobs in that area.

The building of an entirely new plywood barn is illustrated in the photograph of Fig. 11. This was erected at Purdue University using exterior type Douglas fir plywood for outer walls and roof sheathing, as well as for interior partitions including grain bins. The entire structure was wind-tight and the plywood supplied all the bracing effects required for a thoroughly rigid structure.

Plywood seed boxes, as shown in Fig. 12, were developed in California, and have many advantages over the conventional burlap or paper sacks. They supply better protection to the contents, are more easily handled by mechanical lift trucks, and provide greater storage capacity per square foot of floor area.

Perhaps the ultimate in size, an 8′ cube, for such a grain storage box, is indicated in Fig. 13. This grain bin, made of ⅝″ plywood will hold 400 bushels, of 16.2 tons of wheat. It was intended for use inside the sheep barn, and except for the bottom quarter is readily emptied through the louvered door shown.

This plywood grain bin technique,

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with some modifications, will provide bulk feeding equipment, from elevated storage vats, as is illustrated in Fig. 14. Spiral conveyors mechanically transfer the feed from the delivery truck to the top of the bins. The sloping bottom discharges the feed, by gravity, directly into the feed troughs, with such gate controls as may be required. Not only is this method economical and labor saving, but the feed is properly stored in tight enclosures, that maintain commendable cleanliness.

• • •

Much of the data and many of the pictures used in this article were supplied by the Douglas Fir Plywood Association.

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NAFM SUPPLY, EQUIPMENT & FABRIC FAIR

More than 2,500 furniture and woodworking executives are expected to attend the 1956 NAFM Supply, Equipment & Fabric Fair at the Conrad Hilton Hotel, Chicago, August 26-30, 1956. The forecast of a 50% increase in attendance over last year when 1700 industry representatives registered for the Fair is based on replies to an invitation extended by Kenneth Kroehler, first vice-president of Kroehler Mfg. Co., and president of NAFM. Replies indicate officials from many companies who did not attend last year will come to Chicago for the Fair this year. States showing the largest increase include California, North Carolina, Texas and Virginia.

Executives from 29 states, Mexico

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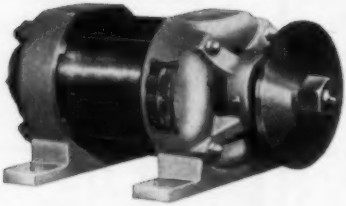

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and Canada have already replied favorably, one week after the invitation was sent. Those who came last year are generously all coming again, the replies indicate, and many firms that previously sent only one or two representatives will send from three to six this year. In one case, 15 representatives from one large manufacturer said they would come.

The type of executive coming includes: presidents, vice presidents, sales managers, designers, factory superintendents, finishing foremen and other technical supervisors.

"Over 250 top technical experts will be on hand to consult with woodworking executives," Mr. Kroehler said. These experts have only limited opportunity for plant visits, yet they have the up-to-date "know how" to help reduce costs and improve production.

CALENDAR OF EVENTS

Sunday, August 26.

8:30 a.m. - Executive Committee

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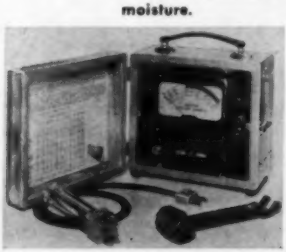

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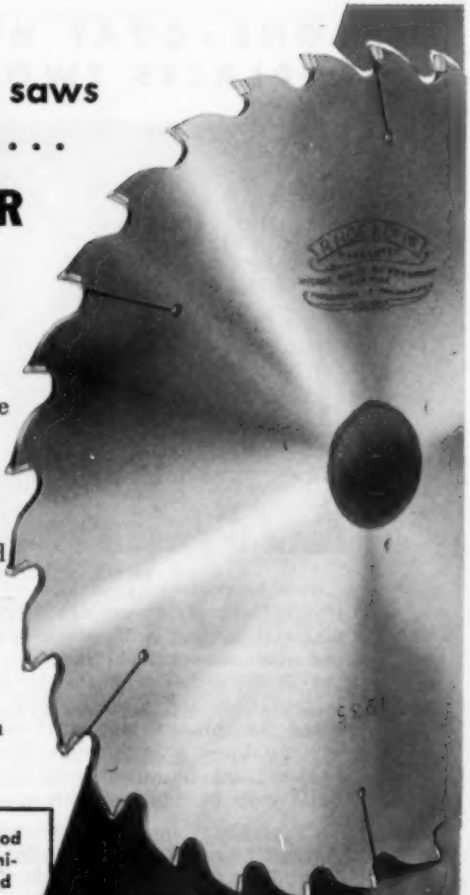

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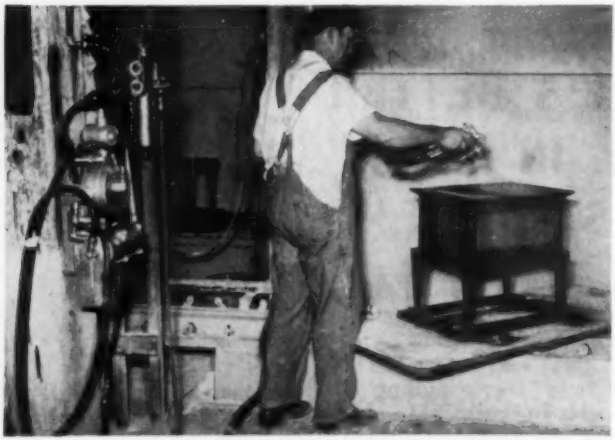

300 APE unit illustrated above.

Product manufacturers can effect an important time and material savings with a hot spray heater. Designed for use with conventional lacquers, sealers, and varnishes, the Spee-Flo heater heats the material to a level where temperature and viscosity are uniform. Heat is substituted for thinner, and rapid solvent evaporation at the gun produces a high-solids film deposit. Coverage and hold-out are improved, and shrinkage is reduced. Film build may be doubled with standard materials.

Spee-Flo Company publishes a booklet, "Why Hot Spray?", available without charge. Write **Spee-Flo Company**, Dept. WW-6, 720 Polk, Houston, Texas.

Breakfast Meeting.
12:00 Noon - NAFM Board of Directors Luncheon Meeting.
2:00 p.m. - Official Opening of Fair.

Monday, August 27.
9:00 a.m. - Convention Program - Speaker: Martin Gainsburgh, National Industrial Conference Board. "Current Economic Trends."
10:30 a.m. - Speaker: Max Shore, Elmer I. Klein Co. "Motivating Salesmen."
12:00 Noon to 2:00 p.m. - Luncheon Meeting Speaker: Pierre Martineau, Chicago Tribune, "The Changing American Consumer."
6:00 p.m. - Reception for Exhibitors and Registrants at Fair.

Tuesday, August 28.
9:00 a.m. to Noon - Upholsterers Session.
9:00 a.m. to Noon - Finishing Session, Sponsored by National Paint, Varnish & Lacquer Assn. (Reports and discussion of furniture manufacturers finishing problems and testing procedures).
12:00 Noon - Luncheon Meeting, Presentation of Safety Awards.

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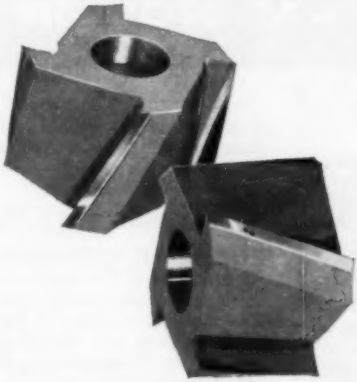

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7:00 p.m. - 28th Annual Banquet - Music and Entertainment, Speaker: Rev. William H. Alexander, First Christian Church, Oklahoma City. "Life's Quiz Program."

Wednesday, August 29.

9:00 a.m. to Noon - Industrial Relations Session. Speakers: Stephen F. Dunn, Labor Relations Specialist, and Charles R. Sligh, Jr. former president, National Association of Furniture Manufacturers.

12:00 Noon to 2:00 p.m. - Luncheon Meeting, Speaker A. L. Fader, A. L. Fader & Co., "What Modern Machinery Means to Costs and Sales."

Thursday, August 30.

9:00 a.m. to 12:00 Noon - Exhibits Open.

INDUSTRY NOTES

AMERICAN PARBOARD CORP.

The Morgan Manufacturing Company, Inc., largest manufacturer of completely fabricated wood parts in America, has been doing research work on wood particle board for approximately two years. The engineering staff has done special research work to develop a high quality particle board that would be in conformity with the dimension product now manufactured.

This research work has been completed and as a result, Mr. Harold R. Tipton and Mr. David B. Morgan, Jr., have formed the American Parboard Corporation which will be housed in a building alongside the Morgan plant in Black Mountain, North Carolina. Executive offices will be in Black Mountain.

The product will be a high quality wood particle board made from selected Appalachian hardwoods mixed with a resin adhesive; to be produced in thicknesses from 3/8" to 1¼", shaped and cured under pressure in sheets 5' x 8', or cut to size as required by the manufacturer using it. It will be marketed under the name of "Parboard."

J. LEE HACKETT AUCTION

The J. Lee Hackett Company of Detroit, Michigan, sold at auction on June 15, its line of used and rebuilt machinery. The firm will discontinue its machinery rebuilding department to concentrate on the sale of new equipment.

The sale, at which hundreds of pieces of equipment were sold, was under the direction of Industrial Plants Corp., of Chicago.

AGERSTRAND BUYS WOODTOOLS

Grinnell F. Oliver, president of the Agerstrand Corporation, Freeport, Illinois, announces the purchase of the Woodtools Company of Beloit, Wis. The consolidation of the Agerstrand and Woodtools Companies places the new organization in a position to manufacture and distribute a complete line of woodworking knives and cutters.

The Agerstrand Corporation, formerly of Muskegon, Michigan, has been manufacturing woodworking knives and cutters for 10 years. Four years ago the company was moved to its present site in Freeport, Illinois. Along with the manufacture of woodworking tools the Agerstrand Corporation manufactures precision spindles and machine parts. Their heat treating plant is one of the largest and most complete plants, for the tempering of woodworking tools, in the area. With the production of woodworking tools the new company will continue to represent other woodworking machine manufacturers as their sales agents.

Mr. Oliver has appointed Carl C. Chekouras, president of Woodtools Company, as manager of the newly formed division. The organization will be called "Woodtools Division-Agerstrand Corporation." Carl Chekouras brings to the company many years of experience in

the woodworking tool field, having been on the staff of Yates American Machine Company and Wisconsin Knife Works in their cutterhead and knife departments.

All offices and facilities will be located at 107 N. Henderson Ave., Freeport, Illinois.

A new catalog is being prepared showing the entire line of tools manufactured by the company.

RESEARCH LABORATORY EXPANDS

A two-story addition to the Western Pine association's research laboratory in Portland has just gone into service.

Increasing the lab's floor space by 60%, the new addition provides needed room for an increased volume of research and development work undertaken by this branch of the lumber industry.

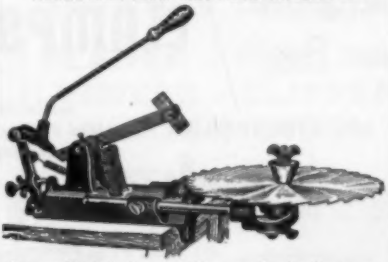
Opening of the structure marks the third expansion move in the 33-year history of the Western Pine research department. Organized in 1923, the lab has grown from a staff of one man engaged in lumber seasoning studies to a staff of 11, busy on a broad range of testing and development work.

Carl A. Rasmussen, director of research for the association, said the addition enables the lab to keep pace with steadily growing volume of lumber product and utilization research on behalf of the approximately 400 Western Pine member mills in 12 western states.

NEW DEALER SALESMEN LEARN HOW TO SELL DELTA POWER TOOLS

More than 50 new dealer salesmen from the Pittsburgh and Cleveland areas have completed a training school at the Rockwell Manufacturing Company's Delta Power Tool Division headquarters in Pittsburgh. Two four-day schools were necessary to accommodate all applicants.

SIMPLEX
CIRCULAR SAW SETTING MACHINE



An excellent tool for setting small circular saws. The successful operation of all circular saws depends largely upon the manner in which they are fitted.

To obtain the best results the teeth should be properly and evenly set.

This machine does the work perfectly, insuring easy and true running and smooth cutting.

The hammer strikes every blow with equal force and at the same angle hence the set of each tooth is absolutely uniform. Will give a light, medium or heavy set.

Adjustable for saws, either rip or cut-off, from 5" to 24" in diameter.

The machine will last for years if handled with ordinary care and intelligence.

Further details upon request

ZEILLER & NAGEL, INC.
232 JAVA ST. BROOKLYN 22, N.Y.

dependable **HARDWOOD DIMENSION**

- finished, semi-finished or rough
- lumber or parts
- solid or laminated
- corestocks, blocks
- wood-and-plastics
- Gam-en-wood

GAMBLE BROTHERS GB GUARANTEED BOND INCORPORATED

Engineered Wood Parts in Southern and Appalachian Hardwoods, Walnut, or Mahogany.

OFFICES AND PLANTS Louisville 9, Kentucky

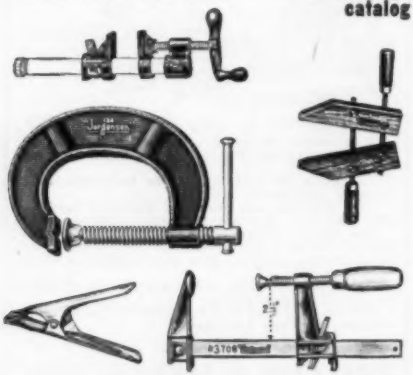
The school was set up to provide new dealer sales teams and new salesmen for old dealers with basic sales information. Delta has held similar schools in New York, Los Angeles, Chicago, and several other cities. The men work with Delta tools and also see 6 new films demonstrating various tools and machines.

Genius: Initiative on fire.

"Jorgensen" and "Pony" / CLAMPS

ASK YOUR SUPPLIER

write for free 32-page catalog



the clamp folks / ADJUSTABLE CLAMP CO.
418 N. Ashland Ave., Chicago 22, Ill.

Appointments

John W. Goetz, Jr., Trenton, N.J., has joined Atlas Plywood Corp., as vice-president in charge of warehousing. The position is a new one. Mr. Goetz will be located in Trenton until the end of 1956. Thereafter, the Trenton office will be merged with the company's executive office in Boston.

Eagle Lock and Screw Company has appointed **William D. Rohlf** and **Merle W. Semisch** as southeastern sales representatives. They will cover: Georgia, Tenn., Ala., Miss. and Fla., headquartering in Atlanta, Ga.

Harry E. Mitchell has recently joined the Carboloy Department of General Electric Co., Detroit, as a carbide tool sales representative for the midwest. Mitchell will make Tulsa, Okla., his headquarters.

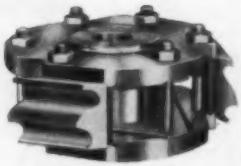
The election of **Robert A. Bintz** and **Lester Klempner** as assistant vice-presidents has been announced by National Starch. Both men have been with the firm for more than 15 years.

John Collinge, president of G. M. Diehl Machine Works, Inc., has been elected to the board of directors of the Young President's Organization at their recent national meeting. This national organization consists of men who are presidents of companies grossing over a million dollars per year—and who were president before reaching the age of 40.

The G. M. Diehl Machine Works announces two appointments. **Orville Mowery** has been named chief engineer.

GRAYCON

CUTTERHEADS & KNIVES
FOR ALL TYPES OF
WOODWORKING MACHINES



GRAYCON TOOLS INC. WABASH, IND.

F. J. "Jim" Mooney has been named as service engineer, specializing with work on molders.

The Atkins Saw Division of the Borg-Warner Corporation has appointed **T. J. Clark** as northwest division manager. His headquarters will be in Portland, Oregon. **C. N. "Chuck" Frame** is now manager of the chain saw department. He will supervise all manufacturing, merchandising and marketing activities of the department.

Elmer D. Hartig has joined the Rockwell Manufacturing Company's Power Tool Division as Iowa-Illinois district sales manager. **Robert S. Grimmett** has been named Houston district sales manager. The district includes southern Texas and part of Louisiana.

Portable Electric Tools, Inc., of Chicago, announce the appointment of **Elmer J. Murray** as national sales promotion manager. Murray will spearhead the firm's new selective area sales program.

John R. DeBacher has been elected a vice-president of the Thor Power Tool Co., Aurora, Ill. His activities will encompass every phase of the company's business of centralization of all Thor manufacturing, sales and engineering divisions.

Onsrud Machine Works has elected officers as follows: **Albert L. Breuer,** vice-president in charge of machine tool sales; **Robert M. Miller,** vice-president in charge of woodworking machinery sales; **Earl Pankonin,** vice-president in charge of engineering and **John F. Andrews,** comptroller. Advanced were **G. M. Campbell,** from vice-president and secretary to executive vice-president; **John M. Wilken,** from assistant secretary to secretary. Re-elected were: **R. F. Onsrud,** president; **Frank H. Lamson-Scribner,** assistant to the president; **C. F. Jacobson,** vice-president and (Miss) **H. R. Krabol,** treasurer.

Eldon Brewster, formerly general accountant with the Auto-Nailer Co., has been made assistant comptroller. **Frank D. Nelms** has been promoted from chief

LOWER COST—RAISE PRODUCTION with the CONSISTENT HIGH QUALITY of

DETROIT KNIVES

PLANER - MOULDER
VENEER - CLIPPER
SHAPER STEEL

70 YEARS

Devoted to Knife Making EXCLUSIVELY!

For true economy, smooth performance, labor saving time, because of less down time between sharpenings, buy DETROIT KNIVES—better balanced, precision ground of our own H.S. Steel. Modern — Up to Date mills prefer them.

PROMPT SHIPMENTS!

Better Knives Since 1885

DETROIT EDGE TOOL CO.
6370 E. NEVADA
DETROIT 34, MICHIGAN

clerk, sales department, to sales correspondent.

New public relations director for the National Housing Center in Washington, is **Sydney H. Kasper.** He formerly directed publications for the Housing and Home Finance Agency.

NOTED TRAFFIC FIGURE PASSES SUDDENLY

Frank P. Borden, for 20 years traffic director for Douglas Fir Plywood Association and well known in professional traffic circles throughout the country, died suddenly in Tacoma, June 4, from bronchial pneumonia.

Borden was connected with firms in the plywood business for 30 years and during his career he played a solid part in a spectacular period of expansion in the fast moving western fir plywood industry.

The 51-year-old traffic executive was born in Denver, Colo., and he had been a resident of Tacoma for 33 years. He entered the traffic field in the 20's, working with several major railroads including the Santa Fe and Union Pacific roads. Subsequently he joined the former Wheeler Osgood Co. of Tacoma, Wash., as traffic manager and he worked with the firm for more than a decade.

Borden organized a concurrent independent traffic consulting practice and one of his early clients was the former Fir Door Institute. In 1936, he was employed as a traffic consultant by Douglas Fir Plywood Association and later he set up a full time traffic department for the association which he headed, setting the basic pattern for the many traffic services rendered to the plywood industry today.

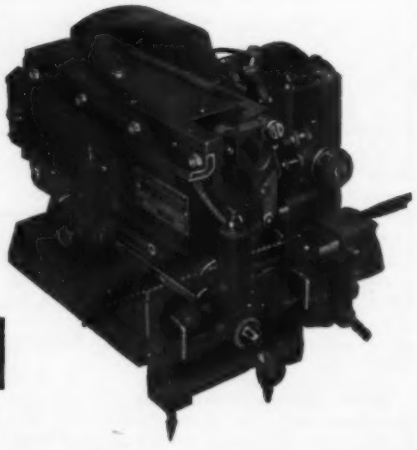
Under his impetus, the industry has chalked up a substantially below-average record for damage claims. Always interested in new methods of materials handling, Borden at the time of his death was deep in a program of research and testing, looking toward the development of more economical open car loading of plywood.

DOES WORK OF TWO MACHINES
Wardwell "K5" Joints, Sets, Files

BAND SAWS
in ONE OPERATION

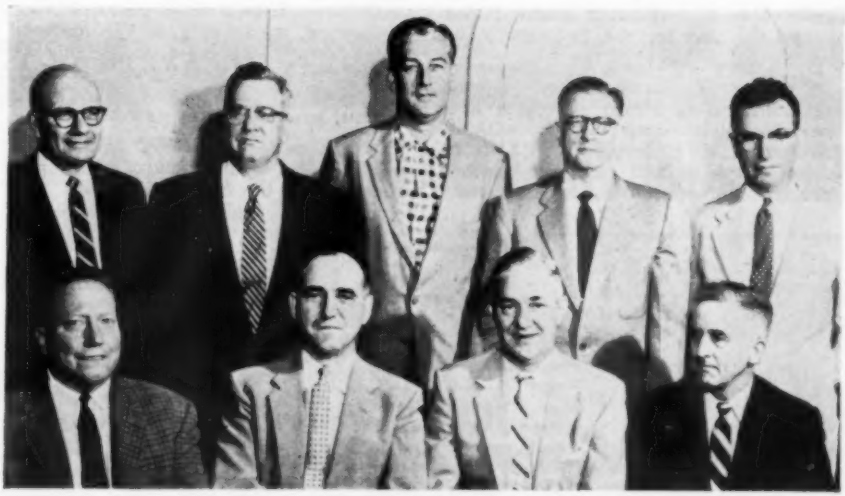
Sharpens 60 teeth a minute—with absolute uniformity. You get cleaner, faster cutting band saws with 30% to 50% increase in efficiency. In addition, "K-5" saves you the cost of a second operation. A special feature is that saw is firmly locked by solid steel cam when being filed and set.

Write for free bulletin No. "K-5."



WARDWELL MANUFACTURING CO.
3806 Ridge Rd., Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines



Left to right, first row: Berry, Kaufert, Bescher, Christian. Top row: Warner, Irwin, Ritchie, Lockard, and Hiller.

WHAT HAPPENED AT ASHEVILLE?

There is a "gold mine" to be found in wood residues and improved production practices, if the some-50,000 companies that make up the diverse forest products industry—from logging to furniture manufacture—will but put them to good use. That was the tenor at the conclusion of the Forest Products Research Society's 10th National Meeting, held at Asheville, N. C., the week of June 4-8.

More than 1,000 members, guests, exhibitors, and persons viewing exhibits only, represented most of the United States, Canada, and numerous foreign countries. Official registration was 808.

The meeting demonstrated once again the permanent need and eager acceptance of a technical and non-technical organization which can provide meeting grounds for the dissemination and interchange of information on every phase of wood technology.

What are the coming things in the wood industry? New products from bark, a gradual increase in the use of sawdust, and the expanding and perfecting of existing products. Other developments will include chemical plants using wood as a raw material and the day when lumber will be delivered to customers cut to specifications.

Particle board—the lumber reconstituted from residues, shavings, and glue—is the hottest thing to hit the wood industry in recent years, according to Dr. George Marra, Head of the Division of Industrial Research, Washington State College, and Chairman of FPRS' National Particle Board Committee. Particle boards are tough, cheap to produce, can be built to order, made fire, termite and moisture resistant, and

can even be turned out in colors. It has opened the way for the industry to be able to utilize 100% of the tree.

A new machine, described for the first time before FPRS delegates, is a "knife" which slices lumber without sawdust waste. If developed into widespread usage it will save the lumber industry enormous sums; for in cutting small items from a large piece of wood by sawing, up to 50% of the material which now becomes sawdust may be saved. The knife, developed by Gilbert Schnieder of Lexington, Ohio, cuts without producing any sawdust.

Future issues of WOOD WORKING DIGEST will carry some of the papers presented at the meeting.

NEWLY ELECTED EXECUTIVE BOARD

President
Ralph H. Bescher
Mgr., Wood Preserving Division
Koppers Company, Inc.
Pittsburgh 19, Pa.

Pres.-Elect (Newly-elected)
Frank H. Kaufert
Director, School of Forestry,
U. of Minnesota,
St. Paul 1, Minn.

Vice-Pres. (Newly-elected)
W. Jeter Eason
Vice-Pres.
Nickey Bros., Inc.,
2700 Summer Ave.,
Memphis 12, Tenn.

Past President
M. B. Christian,
Director of Research,
Chicago Mill
& Lumber Co.
Tallulah, Louisiana

North-East Regional Board Member (New by appointment)
Charles R. Lockard,
Chief, Forest Utilization Service
U.S. Forest Service,
N.E. Forest Experiment Station,
102 Motors Ave.,
Upper Darby, Pa.

North-West Regional Board Member
John D. Ritchie,
Director, Allied Prod. Div.
Douglas Fir Plywood Association
1119 A Street,
Tacoma, Washington

North-Central Regional Board Member
Robert L. Hiller,
Tech. Sales & Service Represent.
American Cyanamid Co.,
Route 1,
Hartland, Wisconsin

South-East Regional Board Member (Newly-elected)
W. L. Irwin,
Works Manager,
Poinsett Lumber Mfg. Co.
Box 181
Pickens, South Carolina

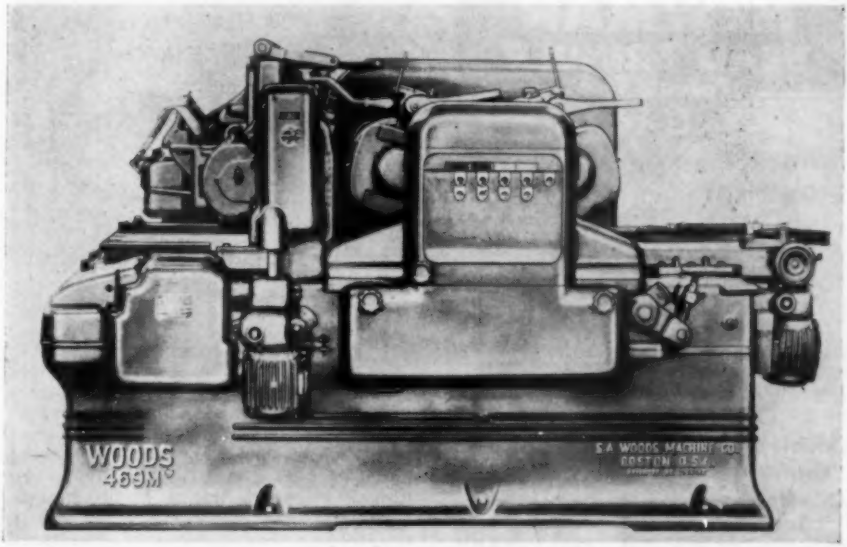
South-Central Regional Board Member (Newly-elected)
W. R. Warner,
Manager,
Southern Lumber Co.
Warren, Arkansas

Southwest Regional Board Member
Raymond H. Berry,
Vice President,
Scott Lumber Co., Inc.,
Shasta County
Burney, California

Executive Secretary
Frank J. Rovsek,
P.O. Box 2010, University Sta.
Madison 5, Wisconsin

EQUIPMENT AND SUPPLIES for the WOODWORKING INDUSTRY

NEW SERIES OF BLANKERS



Substantial reduction of splits from running cupped and warped lumber is easily accomplished with the new S. A. Woods blanker. In most pine mills, great losses have been suffered when feeding cupped lumber through a planer because the roll and chipbreaker pressures subject the board to strain resulting in split lumber. The blanking machine, placed between the feed table and matcher, helps eliminate these losses by presurfacing the board before it enters the matcher. The result of this operation gives the customer better lumber and the mill avoids degrading losses and realizes greater production.

The 469M blanker has built in jointer bar for top and bottom cylinders. Bottom head cylinder can be pulled out for changing knives without disassembling motor. All operating adjustments can be made from the front or working side of the machine. Woods blankers have sectional beveled top feed rolls bearing on top near the edges of cupped lumber. The 469M is powered by three Woods motors of 30-75 and 100 h.p.

In addition to the 469M, the S. A. Woods Co., Boston 27, Mass., produces the 461M and 463M blankers with the same features but for use where less production is required.

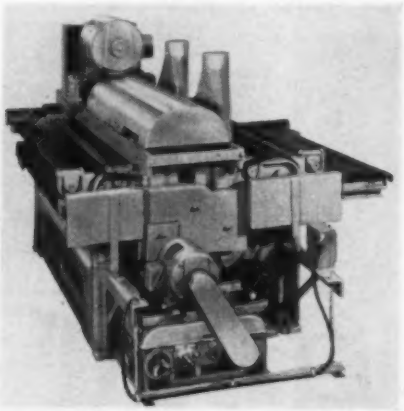
PLANE BLADES

A carbide-tipped plane blade of the straight-fluted type, developed especially for the J5 Stanley plane, has been added to the O.C.E. woodworking tool line distributed nationally by Price & Rutzebeck.

Illustrated plane blades literature is available on request from Price & Rutzebeck, exclusive distributor, at 22150 Meekland Avenue, Hayward, California.

PANEL SIZING SAW

Beach Manufacturing Company, manufacturer of wood working equipment, in Montrose, Pa., has just developed a new, high speed panel sizing saw designed to rip wood panels of any length into strips of any width. A specially constructed arbor accommodates as many saw blades as a job may require; and dado blades or groovers can operate simultaneously while cutting.



Specially designed outboard bearings permit blades to be added to, or removed from, the arbor without tearing down the machine. Safety hoods are hinged for quick access to the blades. Cutting width can be varied by a simple nut and screw-set adjustment on the sleeves.

The Beach Saw is equipped with a double set of power-drive feed rolls that grip so firmly that the material being worked cannot creep or kick back. For use with exceptionally thin materials, such as plastics, the saw may be had with an extra set of power-driven feed rollers (8 in all). The machine is provided with dust control attachments that remove sawdust and chips.

Several standard size models are available, providing maximum cutting width of 24", 30", 38", 42", 48" and 54". Special sizes may be ordered to meet any particular requirement.

THE CRAFTOOL DUSTMAN

The Dustman is a powerful, portable, self-contained dust collecting system that uses any standard garbage or ash can as its waste receptacle. It collects sawdust and dust right at the machine. The Dustman is also used for cleaning the machines and for general cleaning in the shop area.

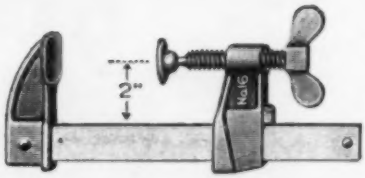
This machine draws in the sawdust or dirt through the standard hood and 2½" diameter hose. The suction is created by a powerful specially designed 8" pressure type blower. The sawdust is drawn through the blower and deposited in the garbage or waste can. The free air is permitted to escape through a filter bag located on the top of the machine. The Dustman is powered by a 1/3 h.p., ball bearing, capacitor type motor.

Complete information is available from Craftools, Inc., 401 Broadway, New York 13, N.Y.

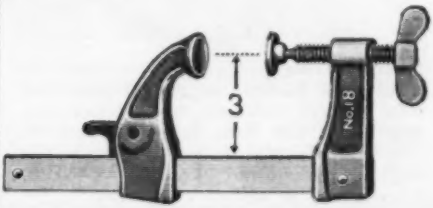
SKOOG PATCHERS

The Skoog Engineering Co. is offering two veneer patching machines to the industry. The one is called type O.B. and is equipped with P-111 dies

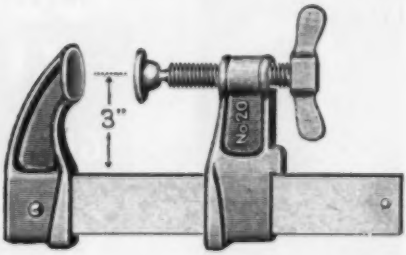
VERSATILE SINGLE BAR CLAMPS



Style 16 . . . has adjustable head piece and Style 17 (not illustrated) adjustable tail piece.



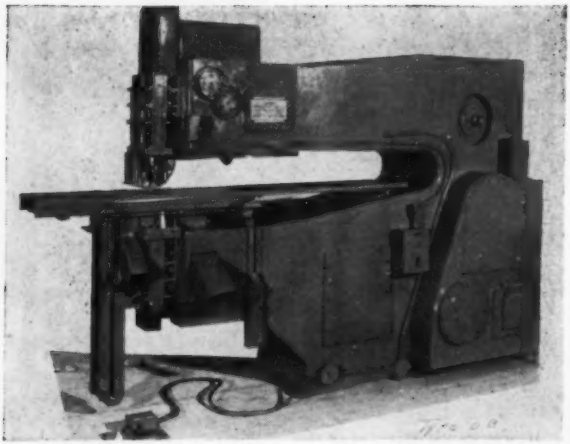
Style 18 . . . has adjustable tail piece.
Style 20 . . . has adjustable head piece.



These HARTFORD Single Bar Clamps are quick adjusting and self locking and unlocking.

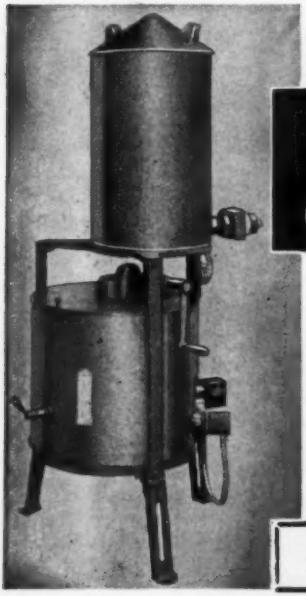
Write for illustrated catalogue.

The Hartford Clamp Co.
EAST HARTFORD CONN.



(pointed ends). Skoog says the machine refutes the theory that veneer punching dies require radii on cross grain cutting ends. The firm says that the die will cut cleanly in woods which are difficult to rout and that end cross grain breakdown is almost eliminated.

Throat opening on the O.B. is 62" from the center of the tool. Maximum plugs per minute, 42, with magazine type plug-feeder mechanism using precut blanks. The thickness of the veneer patchable varies from 1/16" through 1/4". Any shape can be used for the



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LONG-STANTON COMPANY
910 BAYMILLER ST., CINCINNATI, OHIO

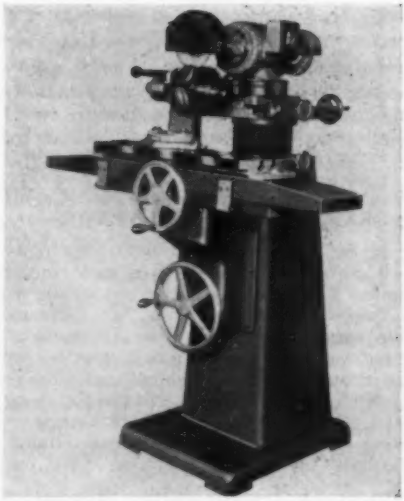
patch if it can be made and accommodated in a 3" x 4" rectangle. Dies available for the machine are both round and elliptical.

Complete information and specifications are available from the Skoog Engineering Co., Box 121, Olympia, Washington.

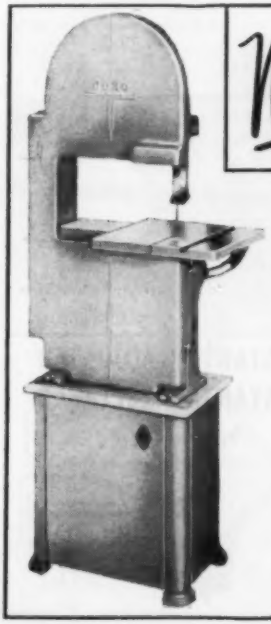
CUTTER HEAD GRINDER IMPROVED

Dependable Machine Company, Inc., Greensboro, N. C., have just announced improvements made in their 106-A cutter head grinder. The 106-A is designed to take side heads, molder heads, profiler heads, spiral heads, shaper heads—in fact, any type of "slip-on" head, shaper cutters, router bits and thick and thin knives.

The new G-12 cutter head grinding fixture for the 106-A has attachments which are used for setting both straight and milled-to-pattern knives and for dressing the grinding wheel. The ball bearing table of the 106-A has been



made universal so that it can be swiveled up to 25°. The machine now has a double spindle motor in place of a



New

HEAVY DUTY CABINET MODEL

BAND SAW

for wood and metalworking

Here is the ultimate in power tools. Built for efficiency, rugged use and safety. (All moving parts protected.) When you see, examine and put this 15" band saw through its paces—you'll quickly recognize that "there is a difference in quality, performance and all 'round utility." Duro engineers have incorporated every feature you want and need—they've built-in every important operating advancement and it is remarkably low priced to fit your operating budget.

Send for FREE catalog

giving full details on this 15" Band Saw & other Band Saws in the Duro Line. Also shows complete Duro Power Tool line.

DURO METAL PRODUCTS CO.

2664 N. Kildare Ave. Chicago 39, Ill.

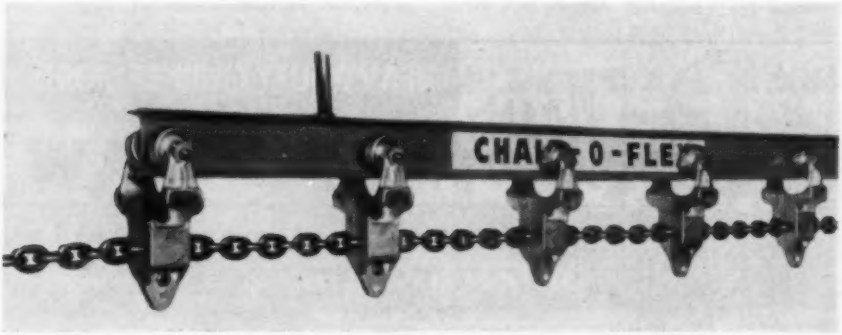
single spindle motor. By swinging the turret mounted motor around, rather than changing grinding wheels, valuable time can be saved. The precision ground adjusting column is now completely protected from grinding dust by an expanding cover tightly fitted to the machine. The motor base slide has been extended to give longer cross-travel of the grinding head unit. Dual operated fine adjustment hand wheels have been provided to feed the grinding wheel to the knife. These are located on each side of the front of the grinding head unit.

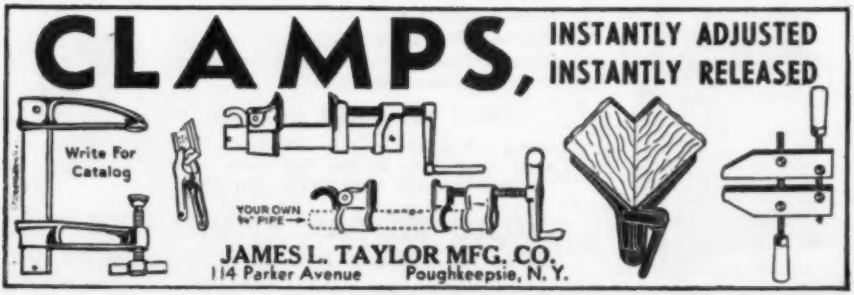
I-BEAM TROLLEY CONVEYOR

Manufacturers of Chain-O-Flex trolley conveyors, announce a new series called T-100 for operation on either 3" I-beam or 2½" x 2¼" x ½" T-beam, for conveyor jobs under all types of conditions in ovens, spray booths, for dips, etc. The T series features Chain-O-Flex special design chain for long life and economy of operation, with strength comparable to forged chains, with an ultimate strength of 18,000 lbs.

A unique 2-piece positive grip design trolley eliminates the need for load pendants. Trolley spacing 8", 12", 16" or 24" centers. Trolley capacities range from 80 to 160 lbs. and can be doubled by the use of load bars. Trolleys are of bolted construction for ease of maintenance. Wheels are ball bearing and are grease packed at factory. The series 100 is especially practicable for operation in high temperatures up to 350° F.

Vertical curves of track can be furnished to requirements, ranging from 3½' radius, up. Horizontal turns are made around traction wheels of either 23" P.D. or 30-5/8" P.D. and are available in 45°, 90° and 180° turns.

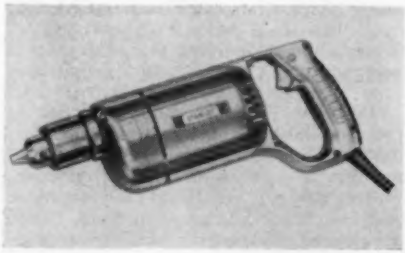




Full details may be had by writing the manufacturer, Chain-O-Flex Corporation, 3334 Lincoln Avenue, Franklin Park, Illinois.

PORTABLE ELECTRIC DRILLS

A new, competitively-priced portable electric drill, Series 300, is introduced by Stanley Electric Tools, division of the Stanley Works, New Britain, Conn. Designed for rugged maintenance work where one drill must satisfy many needs and for top drilling performances on assembly lines, the new drill meets all requirements for torque, speed and chuck size.



The eight models in the 300 series are ideal for standardization purposes. Three chuck sizes, 1/4", 3/8" and 5/16", are available. Interchangeable handles, either pistol grip or enclosed riveter-type, are also featured on these heavy-duty drills. A press-button safety lock is handily located on the handle near the trigger.

STAPLES IN COLOR

For years there have been requests for colored staples. Attempts to produce them by painting or lacquering were unsuccessful. The first difficulty was to control the amount of coloring applied, since the close tolerances in industrial stapling machines do not allow for much extra dimension on the staples. The other problem was chipping. The top surface of the staple, which is the part that is exposed after the staple is driven, is also the surface

For smoother dressing at LOWER COST . . .

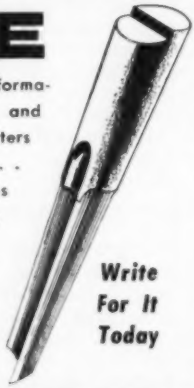
Get a GOOD planer and matcher

• The No. 67 is a medium size matcher of modern design and rigid construction. It is widely used by producers of building material, such as ceiling, flooring, siding, etc. Furnished with a profiling attachment when so ordered. Dresses 3/8" - 6" thick, and 2" - 15" wide. Weighs 9,000 lbs. We make larger and smaller 4-side matchers. Vance machines are well known and widely used throughout the lumber industry. Get additional information today.

J. A. VANCE COMPANY WINSTON-SALEM, NORTH CAROLINA

A NEW CATALOG

FREE



Contains much useful information about Router Bits and Cutters . . . Shaper Cutters . . . Moulder Heads . . . Milled-To-Pattern Knives and Carbide Tipped Bits and Cutters. You will find it most helpful when you need Woodworking Cutters. Be sure to get your copy.

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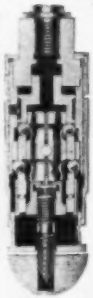
317 Forester Ave. North Wilkesboro, N. C.

NEW TITAN High Speed Hanger Bolt Driver



• TIMED IN SECONDS!

This tool is used by a majority of plants where hanger bolt driving is done on a high production basis. Can be operated at any speed which is safe for driving the hanger bolt. It is not necessary to stop rotation at any time.

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which is struck by the driving blade of the machine. That action would chip off the color.

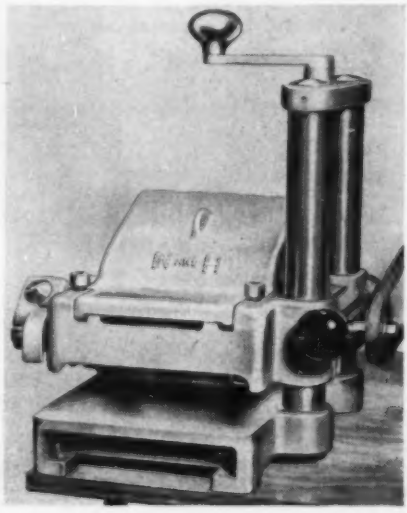
Through the development of a special plastic coating process, Fastener Corporation is now producing industrial staples in various colors. There is a standard line of red, blue, green, and black, but other colors and shades of colors can also be made. These staples are for use where the tacking is done on an exposed surface. By using a staple approximately the color of the material, its visibility is greatly reduced.

For further information write Fastener Corporation, 860 Fletcher, Chicago.

MOLDER-PLANER

The new W & H molder-planer is now available from the Worden Industries, Keene, New Hampshire. This machine is capable of molding, planing, jointing and edging. Hand feed or power feed bench models are available. Chips are ejected through the head away from material and machine.

Equipped with 7⅛" heavy duty planing knives, the machine will plane stock up to 14" width by reversing material. Minimum thickness to which



stock may be planed is ⅛". In a single pass a ¼" cut may be planed off. The output capacity is 15 f.p.m. with power feed.

There is easy access to cutting heads and only four square feet of space are needed to set up the W & H molder-planer and motor.

Complete information and specifications are available from Worden Industries, Box 541, Keene, N.H.

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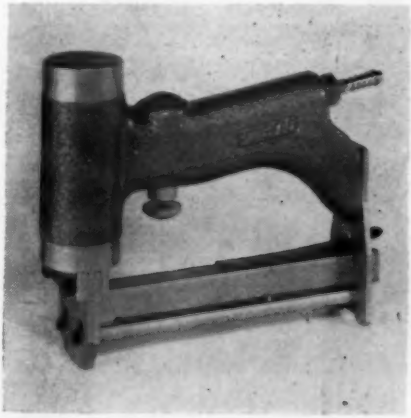

tacker or a stapler by making one quick attachment change. Tacker (without anvil) weighs 2½ lbs.; stapler (with anvil) weighs 2¾ lbs. Both heavy and light staples in ⅛", ¼", ⅜" and ½" leg lengths can be used. Air supply required is 40/50 lbs. The Heller Corporation, Industrial Fastener Division, 2135 Superior Ave., Cleveland 14, Ohio.

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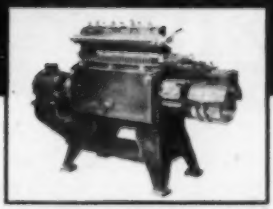

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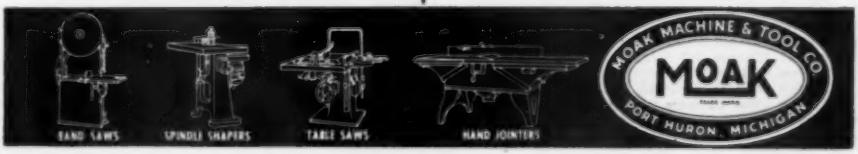

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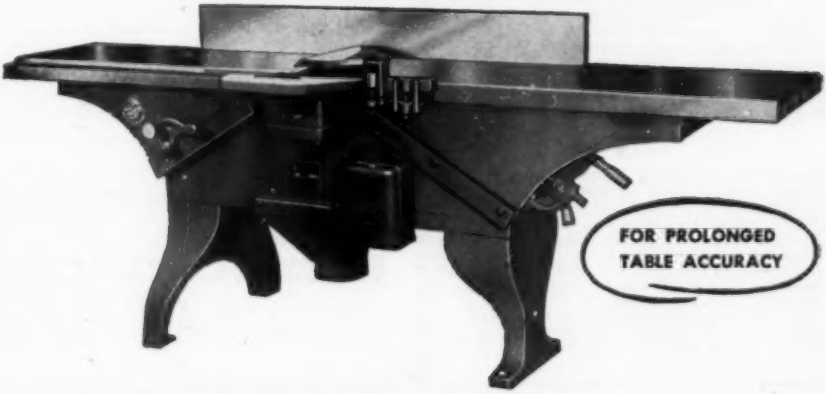

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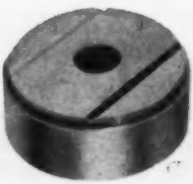

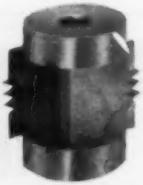

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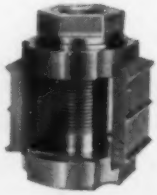

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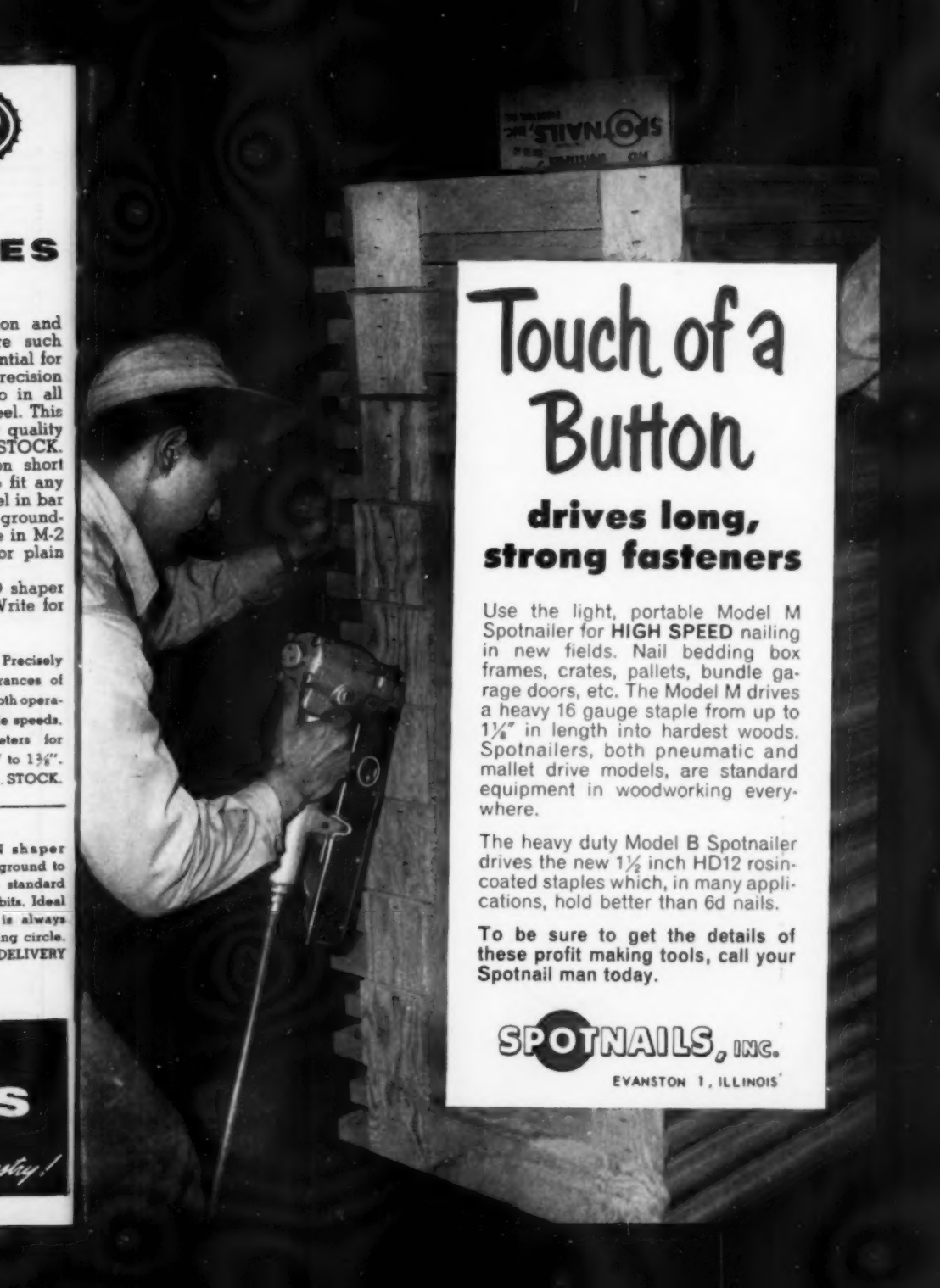
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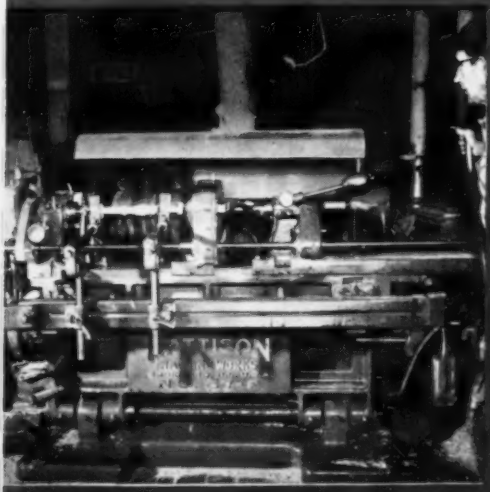

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